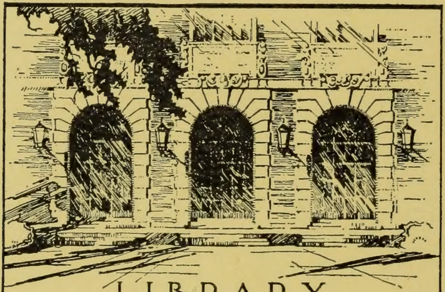

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STATE AGRICULTURAL COLLEGE.

1874.

1859

SALEM, OREGON:
MART. V. BROWN, STATE PRINTER.
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REPORT

To His Excellency,
Governor Grover,
Salem, Oregon:

SIR:—I have the honor to submit the first Biennial Report of the Agricultural Department of Corvallis College. As this is the first regular Report of this Institution, I desire to be somewhat explicit.

PRELIMINARY REMARKS.

When I took charge of this Institution in the fall of 1872, I was met by three very serious embarrassments. First, the Institution was in debt in every department. This, I may remark, has been removed. In the second place, there was no money and scarcely any resources. In the third place, there was no chemical apparatus ; there was a tolerably good apparatus for physics. Of course all was paralyzed. Nothing could be done till an appropriation was made. An appropriation of $5,000 a year was made on the 15th of October, or rather the bill appropriating that amount was approved at that date.

ORGANIZATION.

As it was getting late in the first Session before the appropriation was made, not much could be done during the first year; however, we proceeded to organize under the Act of Congress which requires each State that accepts of the land grant to "maintain at least one College

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where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to Agriculture and the Mechanic Arts, in such manner as the Legislatures of the States may respectively prescribe in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

We conld do but little with only $5,000; however, we organized, and as far as possible furnished and manned two general departments: 1. A Literary. 2. A Scientific Department.

LITERARY DEPARTMENT.

The Literary Department comprehends: 1. A School of Ancient Languages. 2. A School of Modern Languages. 3. A School of History and Literature. A reference to the catalogue of 1873–74 will make the details of these Departments plain.

SCIENTIFIC DEPARTMENT.

This comprehends: 1. A School of Mathematics. 2. A School of Engineering. 3. A School of Practical Mechanics and Technology. 4. A School of Physical Science in general, comprehending Chemistry, Natural Philosophy, Biology and Agriculture. 5. A School of Moral Science.

Having only three teachers, we can teach only such subjects as are conditions of the others. Accordingly we have put into active operation the Schools of Mathematics, the School of Languages, the School of Physical Science and the School of Moral Science. This is as far as our means allow us to go.

GENERAL CONDITION OF THE DEPARTMENTS IN OPERATION.

We have, during the two years past, had, in the Institution, forty-four (44) State students. The most of them are of the best young men in the State, men of fine muscle and brain; men who come here to learn; who wish to learn because they feel the need of education.

Nothing can better show the wisdom of the Act of Congress than the actual teaching of such men. I must make one remark about the State law, providing for the appointment of students. That law renders eligible to the college any youth sixteen years of age, no other qualification being required. The consequence of this is, that many young men are received here who are really in the primary studies, such as Arithmetic, Elementary Algebra, etc.; and even some who could not read have been taught here. I mention this to show that we have, in the Agricultural Department, many who cannot be put in agricultural studies when they enter college; and, as they stay here only four years, they never can reach such studies. Many of them remain only one year, some two, and others longer. Probably these are troubles that cannot at present be well avoided. These facts show, at least, the great need of education among the people.

The four departments named above are in successful operation. It is, of course, necessary to distribute the work of these departments among the teachers. Professor Emery has charge of the Department in Mathematics. Professor Hawthorne has charge of the Department of Languages. Captain Boswell has charge of the Military Department. I have charge of the Departments of Physical Science and Moral Science. Under the head of Physical Science comes the Agricultural Department, in so far at least as the Science of Agriculture is specially dependent on chemical science. The following are the reports of the teachers:

SPECIAL WORK OF EACH DEPARTMENT.

Department of Physical Science — B. L. Arnold, Teacher.

In this department are taught: 1. Chemistry, general and analytical; 2. Chemical Physics; 3. Natural Philosophy; 4. Biology. Under the head of Chemistry comes Agricultural Science. The course in Chemical Analysis relates chiefly to Agricultural Analysis. The course in Qualitative Analysis consists chiefly in the separation of the metals and some classes of salts. I shall extend this course as soon as relieved from other studies, and supplied with suitable arrangements.

Chemical Apparatus.

When I took charge of this Institution, two years ago, there was almost no chemical apparatus; absolutely none for analytical purposes. We have, however, succeeded in collecting a tolerably good apparatus; enough, with some few exceptions, to perform all the analytical operations in agricultural chemistry. Some important improvements are to be made during the coming year. We shall then be pretty well equipped; but we need at least $10,000 worth of apparatus.

Agricultural Chemistry.

Agricultural Chemistry is the only scientific foundation of agriculture; and hence it is thought best to bestow much attention on this subject. After the preliminary studies in general Chemistry and other subjects, the student begins with the analysis of soils, rocks, etc., then proceeds to the analysis of fertilizers, farm products, such as food, wool, beverages, etc. In order to bring the student into direct contact with the best authorities on the subject, I have introduced the methods of Prof. Emil Wolff, who is, perhaps, at the head of all scientific agriculturists. During the past year, six students, five gentlemen and one lady, studied Agricultural Analysis. As it was late in the session before they could reach the subject, they studied only the analysis of soils. I may remark, however, that under my supervision, they each and all worked through the Qualitative Analysis of the Metals. The five gentlemen in this class were agricultural students. They studied, in addition, the general methods of preparing soils, the subject of fertilizers, drainage, etc., and the nature and constitution of plants. Other subjects were taught, but not thoroughly, for the simple reason that we had no time. When it is remembered that we each have an average of eight recitations a day, it will not be wondered at that we do not teach a greater variety of subjects. This subject will be enlarged as we have time and means.

By referring below to Prof. Emery's report, it will be seen that he has taught during the two years, two classes belonging to this department, viz., Natural Philosophy and Astronomy.

Agricultural Farm.

In order to apply the principles demonstrated in the laboratory and verify the result of analysis, a farm is attached to the College and under its control. I have accordingly begun the analysis of the soil and instituted experiments with wheat. I used the "white soil," because more difficulty is experienced in the cultivation of this than of any other land. I experimented with wheat because this is the great staple of Oregon. It would not be wise to predicate much on the faith of a few analyses, and hence I shall not give a public statement of the nature of the soil till I shall have made a thorough investigation and many analyses. I am diligently at work on this subject and shall soon be able to speak with confidence. So far as my investigations for the present extend I find all the ingredients of a fertile soil. Some few elements seem to exist in rather small quantities; such as potash, lime and sulphuric acid. These elements are *absolutely* necessary to the life of agricultural plants, as all the investigations of Salm, Horstman, Sachs, Knop, Birmer, Lucanus and others demonstrate. But I am disposed to think that thorough draining is more needful for this land than anything else. The following is the plan of treatment indicated by the analysis and other investigations, as published in our catalogue of 1873–74.

White Soil.

I have during this session made an analysis of the so-called "white soil." The sample used was selected by Mr. J. S. Palmer, a first-class farmer of Benton County, and was taken from the Agricultural Farm. The following inorganic substances were found in this sample, viz.: Silica, Sulphuric Acid, Phosphoric Acid, Potash, Soda, Lime, Oxide of Iron, Alumina, Magnesia, and a trace of Manganic Oxide. All these were found in sufficient quantity, except Sulphuric Acid. The amount of Lime is not great. And the indications are that Sulphate of Lime (Plaster of Paris) is the proper chemical remedy. I would suggest its use particularly in connection with grass crops. The chief cause why the soil fails to yield grain perfectly is that it is too wet. It requires many analyses to justify positive assertions, but so far as I have examined the white soil chemically and physically, the following mode of treatment is suggested by every fact: In the first place every mode of treatment will be useless without *thorough draining. Water furrows will not drain this land;* it must be drained by underground drains, sunk at least 30 inches deep, and about 30 feet apart; and further, they should not be more than 100 feet long; this requires that the main open ditches be only about 200 feet apart, and unless this method or some such method be pursued the land cannot be properly drained. This is the method recommended by the best *scientific agriculturists.* After draining pulverize as deep as possible and treat with Plaster of Paris (say 200 lbs. to the acre), cultivate green crops for a few seasons (always plowing them under when in full growth), and the land will soon be rendered fit for grain. Plaster cannot be procured conveniently in Oregon, therefore, as far as possible, supply its place with ashes and marl; quicklime mixed with organic matter may be used, but should not be used alone, or at least it must be used in very small quantity. Sand, straw, good barn manure, all are good for this land. But let this be indelibly fixed in every farmer's mind, that the best remedy is *thorough draining.* This is the best way to correct the sourness of the soil.

Mr. Palmer sent me last Fall a sample of marl from the Yaquina Bay district; upon analysis, I find as much as from ten to twelve per cent. of lime, this marl is, therefore, a good article, and can be applied with advantage.

Experiments on the Farm.

Experiments in any thing can attain to truth only by fixing some point to be reached, and by working steadily to it; the series of experiments must be varied so as to exclude the possibility of error.

In Agriculture a long period of time is generally required to effect anything with certainty, because the perfection of any set of experiments requires a year. I have proposed the following points to be gained by experiment:

First. To ascertain the nature of the soils of this State as far as possible.

Secondly. To ascertain the best methods of draining the clayey soils.

Thirdly. To ascertain the character of the several varieties of wheat cultivated in the State.

These are some of the subjects belonging to the Agricultural College, but we cannot enter on any others till better furnished with teachers and apparatus.

During the first year no chemical experiments were made on the Farm, because no analysis of soils had been made,—the reason of this is shown above. We experimented with cereals sent from Washington, D. C.

Without entering into details, we may state that the Oran Wheat, a Spring variety, seems well suited to this climate; it is early and prolific. Dealers complain that it is shriveled and has a thick bran.

The Yellow Scottish Oats seem to be well suited to Oregon; the yield is good and the plant seems to be hardy. Dealers complain that the grain is too hard. The other varieties turned out poorly.

During the second year we made chemical experiments with various fertilizers and wheat, Spring Club, on the white soil; this, in order to verify an analysis of the soil. By reference to our Catalogue for the last scholastic year, you will find the following remarks: "All these substances were found in sufficient quantity, except sulphuric acid. The amount of lime is not large, and the indications are that sulphate of lime (plaster of Paris) is the proper chemical remedy." Accordingly we instituted the following experiments with plants. We used the same amount of surface, small plots, (Professor Caldwell, of Cornell University, recommends a surface of about twenty inches square), and assuming unity as the standard of comparison, the following are the results:

Plot	1.	Superphosphate	10½
"	2.	Fresh horse manure	8
"	3.	Burnt bones, pulverized	9
"	4.	Spent ashes, treated with sulphuric acid	11
"	5.	Sulphate of lime	12
"	6.	Fresh ashes, treated with sulphuric acid	11½
"	7.	Air-slacked lime	8
"	8.	Urine (human)	9
"	9.	Spent ashes	8½
"	10.	Fresh ashes	9½

Thus it is seen that the largest yield is given by sulphate of lime, precisely the substance pointed out by the chemical analysis. The table shows the following striking fact: that in every case in which sulphuric acid was used there was a marked increase in the yield; thus, while spent ashes yielded only 8½, the same kind of ashes, treated with sulphuric acid, yielded 11; here is a difference of 2½ in favor of the sulphate. From 4 and 5 we learn that only a very small per cent. in the increase is attributable to the alkalies. So far as these experiments go, they show that sulphate of lime is indicated. I have done all I could under the circumstances,—pressed with numerous classes, poorly supplied with apparatus, and annoyed by official business, forced to prepare many of the chemicals used, and also the fertilizers, it has been impossible to do as much as could otherwise have been done. I have laid out for the coming year some hundred experiments with plants (chiefly wheat), and if I can be supplied with means, and relieved of some of my classes, I hope at no distant day to publish a pamphlet on the soils of the Willamette Valley. As long as I have charge of this Department I shall continue to work diligently on this subject.

Department of Moral Science—B. L. Arnold, Teacher.

There are two classes in this Department and both have been quite well attended.

The Junior class studies Political Economy and Social Science. The Senior Class studies Logic, Mental Philosophy and Ethics. The following table shows the amount of work in this Department for the last two years:

YEAR.	*Agricultural students.*	*Non-Agricultural students.*	*Total.*
1st Year	4	1	5
2d Year	8	6	14
Aggregate	12	7	19

Logic and Mental Philosophy.

YEAR.	*Agricultural students.*	*Non-Agricultural students.*	*Total.*
1st Year	13	5	18
2d Year	13	6	19
Aggregate	26	11	37

During the first year I taught several classes in Latin, two in Greek and one in German. These are in addition to my Department proper. So during the second year I taught in addition to my regular classes one class in Latin, one in German and one in English Grammar. One hour a day has been allowed me to prepare chemical experiments. The average number of recitations, including the hour allowed for preparing chemical experiments, is eight.

Very respectfully,

B. L. ARNOLD.

Department of Languages—B. J. Hawthorne, Teacher.

To the President of Corvallis State Agricultural College—Sir: I have the honor to present the following report of my Department for the Collegiate year, ending June 17, 1874. During the whole session I heard eight classes every day as follows:

1. Latin, 22 students, of whom 9 were Agricultural students.
2. Latin, 19 students, of whom 6 were Agricultural students.
3. German, 10 students, of whom 4 were Agricultural students.
4. English Grammar, 17 students.
5. Greek, 3 students, of whom 2 were Agricultural students.
6. French, 7 students.
7. German, 8 students.
8. German, 8 students.

President Arnold heard 3 classes of this Department:

1. Latin, 5 students, of whom 4 were Agricultural students.
2. German, 4 students.
3. English Grammar, 18 students, of whom 13 were Agricultural students.

Prof. Emery also heard a class belonging to this Department:

1. English Grammar, 36 students, of whom 15 were Agricultural students.

Thus it is seen that there were 12 classes in this Department, averaging 13 students each.

Latin students	45
Greek students	3
French students	3
German students	30
English Grammar and American History students	71
Total	156

Number of Agricultural students, 56.

The students manifest an earnest desire to learn and they labor faithfully. At least two assistants are needed in this Department, as may be readily seen by the amount of work to be done.

Respectfully submitted,

B. J. HAWTHORNE,
Prof. Languages.

Department of Mathematics—Joseph Emery, Teacher.

To the President of the State Agricultural College—Sir: I have the honor of submitting to you the following biennial report of my department, commencing September —, 1872, and ending June 17, 1874:

First year, from September —, 1872 to June 19, 1873, I taught the following studies:

Mathematics (Preparatory)—First session: Arithmetic, 48 st.—15 ag. st.; Book-keeping, 8 st.—6 ag. st. Second session: Algebra, 26 st.—15 ag. st.

College Proper (Junior Class)—Bourdon, 14 st.—9 ag. st.; Geometry, 14 st.—9 ag. st.

Intermediate Class — Trigonometry, 7 st. — 5 ag. st.; Surveying and Engineering, 7 st.— 5 ag. st.

Senior Class — Analytics, 7 st. — 4 ag. st.; Calculus, 7 st.— 4 ag. st.; Higher Philosophy, 7 st.— 4 ag, st.; Higher Astronomy, 7 st.— 4 ag. st. I also taught English Grammar, 36 st.— 15 ag. st.; Physiology, 7 st.— 4 ag. st.; Latin, 7 st.— 2 ag st.; English Literature, 4 st.— 3 ag. st.; Geology, 5 st.— 3 ag. st.

Second year, from September 14, 1873, to June 17, 1874.

Mathematics (Preparatory)— First session: Arithmetic, 28 st.— 16 ag. st.; Elementary Algebra, 26 st.— 17 ag. st.; Book-keeping, 7 st.— 2 ag. st. Second session: Bourdon, 24 st.— 10 ag. st.; Geometry (4 b.), 12 st.— 10 ag. st.

College Proper (Junior Class)— Bourdon (comp.), 14 st.— 9 ag. st.; Geometry (comp.), 12 st.— 9 ag. st.; Trigonometry (plane and spherical), 19 st.— 11 ag. st.

Intermediate Class — Surveying and Engineering, 18 st. — 10 ag. st.; Analytical Geometry, 11 st. — 8 ag. st.; Dif. Calculus, 9 st.— 8 ag. st.

Senior Class — Calculus, 5 st. — 5 ag. st.; Astronomy (Olmstead's), 6 st.— 5 ag. st.; Higher Philosophy, 6 st.— 5 ag. st. I also taught all year English Grammar, 23 st.— 12 ag. st.; U. S. History, 18 st.— 9 ag. st. Second session: Geology, 5 st.— 4 ag. st.

JOSEPH EMERY,
Professor of Mathematics.

CORVALLIS, Oregon, Aug. 10, 1874.

Military Department—B. D. Boswell, Teacher.

TO THE PRESIDENT OF CORVALLIS STATE AGRICULTURAL COLLEGE—SIR: I have the honor to report that during the past year the number of students enrolled in my Department was 64. Average daily attendance, 15.

I would respectfully represent that the cause of the discrepancy between the number enrolled and the average daily attendance is:

1. There is no room attached to the College suitable for drilling.

2. There are no books on Military Science and Tactics to be had in this city.

3. The majority of the students in my Department are the sons of farmers; hence, they are withdrawn from school during seed time and harvest, which embraces the greater portion of the scholastic year suitable for military drill out of doors.

Notwithstanding these difficulties, the average progress of the class was remarkably good, the students were attentive and seemingly much interested.

I would respectfully suggest that a suitable room for exercise, and the enforcement of some prescribed uniform for cadets would, in my opinion, greatly advance the interests of the State Agricultural College.

Respectfully submitted,
B. D. BOSWELL,
Prof. Mil. Science,
2nd Lieut. 11th U. S. Infantry.

TREASURER'S REPORT.

From October 15, 1872, to June 15, 1874, received from the State in warrants.........		$8,333 31
Paid salary to Pres. Arnold two years..................................	$3,000 00	
Paid salary to Prof. Emery, two years..................................	2,400 00	

Paid salary to Prof. Hawthorne, one year	1,200 00	
Paid salary to Prof. Finley	500 00	
Paid salary to Farmer Liggett	400 00	
Discount on warrants	833 31	
		$8,333 31

Respectfully submitted,
A. CAUTHORN,
Treasurer C. C.

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STATE AGRICULTURAL COLLEGE,

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NINTH REGULAR SESSION—1876.

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REPORT.

To His Excellency,
Governor L. F. Grover,
Salem, Oregon :

SIR :—I have the honor to submit the second biennial report ot the agricultural department of Corvallis College.

ORGANIZATION.

There seems to be a desire on the part of many that all the laws relating to the organization of the Agricultural College be made public in some report. I insert them in this:

In the year 1862 the Congress of the U. S. passed an act providing for the establishment of Industrial Colleges in the several States of the Union. By this law, it is required of each State that should accept the provision of this act, that it "shall maintain, at least, one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislatures of the several States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." It will be seen upon inspection that liberal and practical education in the "several pursuits and professions of life," is the thing to be promoted, and not in two only, (agriculture and the mechanic arts), as some do ignorantly talk; for it can not be meant that men in all professions and pursuits are to be turned away from their several respective pursuits to devote themselves to agriculture and the mechanic arts. The great ideal of the law seems to be this : To bring education in agricultural science and in the mechanic arts upon a level with education in all other pursuits. (I may remark, by parenthesis, that our Legislature, in adopting a course of study for the Agricultural College, well understood the spirit of the law of Congress.) In accordance with the Act of Congress, the Legislature of Oregon proceeded to such legislation as was necessary to organize an agricultural college. On page 40 of the "General Laws" for the year 1868, is found the following Act: "An Act to secure the location of the lands donated by Congress to the State for an Agricultural College, and to establish such college."

The first section of this Act provides that a Board of Commissioners be apppointed to locate lands. The second section provides, "That, until other provisions be made, the Corvallis College is hereby designated and adopted as the Agricultural College, in which all students, sent under the provisions of this Act, shall be instructed in all the arts, sciences and other studies in accordance with the requirements of the Act of Congress making such donation."

On page 17 of the "General Laws" for 1870, we find the following additional legislation in relation to the Agricultural College:

"An Act permanently to locate the Agricultural College of Oregon."

Section first of this Act provides "That Corvallis College, in Benton county, is hereby designated and permanently adopted as the Agricultural College of the State of Oregon, in which all students, sent under the provisions of law, shall be instructed in accordance with the requirements of the Act of Congress, approved on the 2d of July, 1862, granting public lands to the several States and Territories which might provide colleges for the benefit of agriculture and the mechanic arts, and the acts amendatory thereof."

Section second provides "That the following persons, to-wit: J. C. Avery, L. F. Grover and N. H. Cranor, are hereby constituted a Board of Commissioners to propose a plan for the instruction and education of the students in said Agricultural College, and to prepare rules, regulations and by-laws for the government of the same, all of which shall be submitted to the Legislative Assembly at its next regular session for its adoption or rejection, and in the meantime the said College shall be governed by and under the provisions of the Act of the Legislative Assembly, approved the 27th day of October, 1868, in relation to said College." (See the report of this Committee below.)

Section third requires "That the Board of Trustees of Corvallis College shall, by resolutions, accept the provisions of this Act, and agree to be bound by the within thirty days after its passage, and cause a copy of said resolutions to be filed with the Secretary of State, and upon their failure to do so, they shall be deemed to have rejected its provisions."

The following are the resolutions of the Board of Trustees accepting the provisions of this Act. They are found on page 19 of the "General Laws" of 1870. I insert only the resolutions, not the preambles:

"*Resolved*, (1) By the Board of Trustees of Corvallis College, That said Board does accept the provisions of said Act of the Legislative Assembly aforesaid and they do agree to be bound by the same.

Resolved, (2) That the Secretary of the Board is hereby directed forthwith to forward to the Secretary of the State of Oregon, a copy of the foregoing preamble and resolutions.

R. S. STRAHAN, President.

B. R. BIDDLE, Test, Secretary.

"Filed in the office of Secretary of the State, November 2, 1870."

On page 21 of "General Laws of 1872," we find the following Act:

"An Act for the further organization of the Agricultural College, and to provide for the support of the same."

Section second provides, "That the rules, regulations and by-laws for the government of said institution, reported to the Legislative Assembly, at its present session, by the Commission appointed under Act of the Legislature, aproved October 21, 1870, entitled 'An Act to permanently locate the Agricultural College of Oregon,' shall constitute under the several Acts of Congress and of the State relative to said institution, and in conjunction with the Articles of Incorporarion of Corvallis College and the government of said institation established under the same, shall constitute the full organization of said Agricultural College of the State of Oregon."

The following is a copy of this report in all its essential features.

REPORT

Of the Board of Commissioners on Regulations and Course of Study for the Agricultural College of Oregon.

To the Honorable the Legislative Assembly of the State of Oregon:

We, the undersigned Commissioners, appointed by the Act of the Legislative Assembly of the State of Oregon, approved October 21, 1870, entitled an Act to permanently locate the Agricultural College of Oregon, pursuant to the requirements of said Act, beg leave to make the following report, prescribing rules, regulations and by-laws for the government of said institution.

J. C. AVERY,
L. F. GROVER,
N. H. CRANOR.

The rules and regulations, as a matter pertaining wholly to the Board of Trustees and the Faculty, need not here be given.

The following is the course of study adopted by the Act above mentioned, as a part of the report of this committee:

COURSE OF STUDIES.

PREPARATORY CLASSES.

Mathematics—Arithmetic and Algebra.

English—Reading, Spelling, Geography, English Grammar, Penmanship, Composition, Elocution, History of United States.

Natural Science—Natural History, Philosophy, Physiology.

Languages—Latin Grammar, Latin Reader, Greek Reader, Greek Grammar, French Grammar and Reader, German.

Military Exercises—Tactics, Drill.

Agriculture—Practical Instruction on Farm.

FRESHMAN CLASS.

Mathematics—Algebra, Geometry.

English—Rhetoric, Composition, History, Book-keeping.

Natural Science—Inorganic and Organic Chemistry, Qualitative Analysis, Structure and Physiology of Plants, Water, Atmosphere and Soil in their relation to vegetable production, Meteorology, Zoology, Botany, Physical Geography.

Languages—Ancient Geography, Roman Antiquities, Virgil, Cicero, Greek Antiquities, Greek Testament, Homer, French, German.

Agriculture—Theory and Practice of Agriculture, Principles of Tillage, Drainage, Landscape Gardening.

Military—Tactics, Drill.

Excursions—Botanical and Zoological.

SOPHOMORE CLASS.

Mathematics—Trigonometry, (plane and spherical), Navigation, Mensuration, Surveying, Drawing, Maps of Farms, etc.

English—Rhetoric, Logic, Composition, Elocution, Book-keeping, Universal History.

Natural Science—Analysis of Minerals, Ores, Soils, Manures, Ashes of Plants, Mineral Waters, etc., etc., Practice in Mineralogy, Entomology, Geology, Botany.

Languages—Roman and Greek Antiquities, Sallust, Horaces' Odes and Epodes, Greek Testament, Homer, French, German.

Agriculture—Theory and practice of Agriculture, Horticulture, Farm Implements and Drainage, Stock-breeding.

Excursions—Geological and Botanical.

JUNIOR CLASS.

Moral Philosophy—Evidence of Natural and Revealed Religion, Moral Philosophy, (ethics), Political Economy.

Mathematics—Analytical Geometry, Differential and Integral Calculus, Practical Surveying and Engineering.

English—Mental Philosophy, English Literature.

Natural Science—Qualitative and Quantitative Analysis, Mineralogy, Chemistry, (general), Geology, Organic Analysis.

Languages—Livy, Horace's Satires, Epistles, etc., Odyssey, De Corona, Latin and Greek Composition, French, German.

Agriculture—Theory and Practice of Agriculture, Training and Culture of Fruit Trees, the Vine, Small Fruits, Culture of Flowers.

Military—Tactics and Drill.

SENIOR CLASS.

Moral Philosophy—Evidence of Natural and Revealed Religion—continued.

Mathematics—Mechanics, Astronomy, Civil Engineering.

Natural Science—Chemistry, completed, Quantitative Analysis.

Languages—Juvenal, Cicero, Tacitus, Alcestis, (Euripides), Thucydides, Demosthenes.

Agriculture—Theory and Practice of Agriculture, Laying out of Lawns, Ornamenting Grounds, etc.

Military—Tactics, Drill.

Your Commission find it impossible to draft laws and regulations sufficiently comprehensive to meet all the interests of the State Agricultural College. We therefore recommend that the Regents be empowered to make such additional regulations and such changes in the course of study as may be necessary to meet the growing wants of the Institution.

And in relation to the foregoing, we beg leave to suggest that courses of study be so arranged as to give students the option between different courses, or the selection of different studies taught in said College, and that diplomas may be awarded upon courses of study actually mastered by the pupils; this course always being under the direction of parents, guardian and faculty. These are all the laws pertaining to the organization of the College; all, at least, of essential importance.

The Faculty, finding it impossible for the present to teach this entire course, as not having a full corps of teachers, proceeded to select such a course as would best meet the intentions of the law. The course of study was accordingly classified in eight departments, as follows:

I. A School of Mathematics.
II. A School of Language (ancient).
III. A School of Language (modern).
IV. A School of Chemistry.
V. A School of Natural Philosophy.
VI. A School of Moral Science.
VII. A School of Agriculture.
VIII. A School of History and Literature.

Prof. Emery has charge of the School of Mathematics and Natural Philosophy, under which for the present are placed Astronomy and Geology. The following Report of the Professor will show his work in these departments of the School:

DEPARTMENT OF MATHEMATICS AND NATURAL PHILOSOPHY.

JOSEPH EMERY, TEACHER.

The studies in these departments are pursued in the following order:

FRESHMAN CLASS.

First Session—Algebra and Geometry completed.

Second Session—Trigonometry and Descriptive Geometry.

SOPHOMORE CLASS.

First Session—Surveying and Engineering.

Second Session—Analytical Geometry.

JUNIOR CLASS.

First Session—Differential Calculus.

Second Session—Integral Calculus.

SENIOR CLASS.

First Session—Mechanics, Sound and Light, Electricity.

Second Session—Astronomy and Geology.

MATHEMATICS.

Special attention is given to the mental discipline of the student and the development of his intellectual powers, for which the study of mathematics is pre-eminently adapted.

The great practical utility of this branch of science is constantly impressed upon the student, and as far as possible taught and illustrated by some useful application in the field of practical life.

Lectures are given on the Logic of Mathematics, pointing out and comparing the two methods of reasoning—*analytical* and *synthetical.*

The adjustment of the compass and theodolite is fully explained and illustrated by practice in the field.

TEXT BOOKS.

Davies, Loomis, Courtney, Olney and Todhunter for reference.

NATURAL PHILOSOPHY.

The doctrines of *Light*, *Heat* and *Electricity* are taught in this department; Mechanics in its lower forms; Astronomy, Mineralogy and Geology.

The more difficult principles are taught by lectures, accompanied by practical illustrations and experiments in the laboratory.

During the present year we have added (through the kindness of State Treasurer Brown) to our cabinet of min erals, a fine collection of valuable specimens for the class-room.

TEXT BOOKS.

Olmsted, Peck, Dana and Lyell.

SCHOOL OF CHEMISTRY.

In this School are taught the doctrines of Heat, Light and Electricity in their relation to Chemical Science, Molecular Forces and Conservation of Force. Then the history classification and properties of the elements are considered; then the oxides and their reduction, acids and salts. All the principles are illustrated with suitable apparatus and experiments. Last comes the principles of Chemical Philosophy. Here the theories of the Atomic weights, old and new, and in connection therewith the doctrines of the nomenclature, are discussed.

QUALITATIVE ANALYSIS.

The student begins this course by the separation and classification of the twenty-four more common metals, after the method of Elliott and Storer. Then he passes to a consideration of the salts, the methods for the treatment of the more refractory oxides. Lastly, an application of the principles thus learned to the analysis of soils, ores and natural waters.

QUANTITATIVE ANALYSIS.

This course relates chiefly to the analysis of soils, fertilizers and farm products.

AGRICULTURE.

Under this head are taught those subjects that relate to practical farming; in other words, what is termed Practical Agriculture is here taught. This includes Botany and its relations to Agriculture (see below the report of Professor Hawthorne), also Meteorology in its relations to Agriculture. The next thing to be considered is the soil in its physical qualities, its origin, classification and physical preparation, the various methods of drainage and plowing.

The next subject is the Chemistry of Plants, which leads to a discussion of the origin of the food of plants, and thus we are led to the consideration of the Chemistry of the soil and atmosphere. Improvement of soil is discussed in immediate connection with this subject, when the matter of fertilizers is made prominent—the kinds of fertilizers, their preparation, cost, value, modes of application. Here comes the great question: How can we render available the mineral constituents of the soil, so as to preserve them fertile? I may remark that much progress has been made in solving this, and is still making. After this the student studies the subject of Animal Nutrition, how to use farm products most economically for the various domestic animals; and after this many kindred subjects claim attention, such as the history, habits and cultivation of special crops. The subject of fruit culture is taught (see Report of Prof. Hawthorne below).

The next thing that comes is stock-raising. This we find it impossible for the present to teach, being too much crowded. All the rest, above noticed, is taught in detail.

SCHOOL OF MORAL PHILOSOPHY.

I have charge of this School, also. The class begins this course of study with the subject of Logic, Deductive and Inductive; then the principles of Methodology and Modified Logic claim attention. This includes Analogy. Sometimes a double course of Logic is given. Mental Philosophy comes next, and after that the applications of the principles of Mental Philosophy and Logic, in Rhetoric, and Ethics and Political Economy are considered. This course closes with a study of the History of Philosophy, when all the principal opinions held by men such as have governed mankind come in review.

EXPERIMENTS IN AGRICULTURE.

Experiments here are intended to illustrate the principles taught, and also to develop new principles. Our attention has been directed chiefly to the so-called white soil. I have had several analyses of this soil made, and have made several myself, and in every case we find all the substances necessary to the growth of the plant present. I still believe that if the white soil be thoroughly drained, well plowed and cultivated in green crops for several years, it will produce grain as well as any other soil. I have experimented during the period since my last report with wheat in connection with soda, potash, lime in three forms, ashes, sulphuric acid, marl, chlorine, superphosphate of lime, urine, ammoniated phosphate. Of all these, the last is far the best, hastening the crop and producing a much larger yield. It takes a long time to develop and establish, on sure grounds, principles in agricultural science. When, therefore, we shall have arrived at any principles which are proved beyond doubt, we shall set them down for the guidance of the farming community. It is useless and hurtful to send out half-established opinions for the farmers to experiment with.

GENERAL CONDITION OF THE SCHOOL.

The school is in a healthy condition and well attended. During the two years just closing, there have been in attendance ninety-five agricultural students. They have, in general, been men of sterling worth. The State cannot, in my opinion, do better than to foster such men in their education. Surely, it would be a great blessing to Oregon, if we might say of her citizens what the great Grecian statesman said of the Athenian citizens, that the "same individual among us proves himself qualified for the most varied kinds of action, and with the most graceful versatility." A steady pursuit of liberal education must bring to our young and growing State wealth and power, and sending out this influence, she must make herself felt both for the present and future generations. I must applaud, therefore, the wisdom of those men, both in the General and State Governments, who are fostering the education of our people.

BUILDING AND APPARATUS.

The Board of Trustees have had an addition made to the College building; this, together with such changes as are to be made in the old building, will give us ample room for several years; until, at least, two other teachers shall be added to the faculty.

Additions to our apparatus have been made every year, so that we are now in a condition to illustrate all the fundamental principles in Chemistry and Physics.

A glass house is to be built this Fall, when we shall be quite well equipped for the business of the College.

I hope, sir, that any apparent imperfections will be excused, when it is recollected that we are all confined to the class-room six hours a day, and occupied from four to five with preparations therefor.

Respectfully submitted,

B. L. ARNOLD.

SCHOOL OF LANGUAGES.

PROF. HAWTHORNE.

President B. L. Arnold:

SIR:—I have the honor to present the following biennial report of this Department:

It is the aim here to teach language as a science, to explain its laws and its construction.

ENGLISH.

The English language is elevated to an equal rank and dignity with the classical languages. It is studied with the same analysis of its philology and structure, and a thorough knowledge of it is acquired by daily recitations in the writings of the best authors. The language *itself* is studied and the grammar is learned from it, and not the language from the grammar.

Weekly compositions are required.

TEXT BOOKS.

Sprague's English Literature, Brown's Grammar, Whitney's Study of Language, and Select Plays of Shakspeare.

GERMAN.

Whitney's Grammar, Reader, Deutsche Grammatik (Heyse), selections from Goethe, Schiller and other standard authors, Adler's Dictionary.

As soon as the students become familiar with the various inflections, they begin to translate German into English and English into German, continuing meanwhile the study of the Grammar. Following the great American linguist, Prof. W. D. Whitney, of Yale College, I hold that the "study of this language must be, as a rule, chiefly directed to the acquisition of a good *reading* knowledge of it."

FRENCH.

Otto's Grammar, De Fivas' Classic French Reader, Joynes' French Plays, and Telemaque, Spiers and Surenne's Dictionary.

Frequent exercises are required throughout the course. The classes are thoroughly drilled by daily recitations.

LATIN.

Gildersleeve's Grammar, Reader and Exercise Book.

Cæsar, Virgil's Æneid and Cicero's Orations.

Sallust, Horace's Odes and Epodes, Livy, Horace's Satires and Epistles, and Latin composition.

Juvenal, Cicero de Officiis, and Tacitus.

The Chase & Stuart edition of Latin authors is used in the entire course.

Leverett's Latin Lexicon, Long's Classical Atlas.

Our students manifest great interest in the study of Latin. The classes are generally large, and nearly all the agricultural students seize the opportunity of acquiring a knowledge of the language of science.

A clear philosophical insight into the principles of the language being considered more profitable than a collection of mere facts, students are required to explain the structure of sentences by giving *reasons*, and to change from *oratio recta* to *oratio obliqua*, and *vice versa*.

GREEK.

Hadley's Grammar, Xenophon's Anabasis (Kendrick), Homer's Iliad (Owen), Greek Testament, Homer's

Odyssey, Greek Composition, Alcestis (Euripides), Thucydides, Demosthenes, Liddell and Scott's Lexicon, Smith's Classical Dictionary.

Every member of the classes recites daily; translating and analyzing one day and reciting on grammar the next, with written translations of English into Greek.

GENERAL REMARK.

I would respectfully state that I have actually taught classes in all the subjects above mentioned for the last two years. This has compelled me to labor at least ten hours a day. And in addition to all this work, I teach a class in Botany and also one in Fruit Culture.

BOTANY.

Gray's "How Plants Grow," and the "New Manual of Botany," Lectures.

The structure of plants, their nature and their habits, and the principles in accordance with which they are classified, are studied. Plants are analyzed in the classroom, and vegetable physiology is thoroughly learned. Plants are arranged according to the NATURAL SYSTEM.

Particular attention is given to the grass family, including, besides the true grasses, wheat, barley, rye, oats, rice and Indian corn.

FRUIT CULTURE.

Downing's Selected Fruits.

The course is taught principally by lectures. The leading subjects discussed are as follows:

1. Production of new varieties of fruit.
2. Duration of varieties. ...

3. Propagation of varieties, grafting, budding, cuttings, layers and suckers.

4. Pruning.

5. Transplanting.

6. General remarks on insects.

7. The best varieties of apples, cherries, pears, currants, gooseberries, grapes, peaches, melons, raspberries, blackberries, strawberries and plums.

In conclusion, I wish to add that much praise is due the students in my department for their zeal, close attention and gentlemanly deportment.

Very respectfully,

B. J. HAWTHORNE.

August 18, 1876.

CALENDAR.

September 21st	Session Begins.
January 1st	Beginning of Second Term.
April 2d	Beginning of Third Term.
June 27th	Commencement Day.

SCHEME OF RECITATIONS.

	PRESIDENT ARNOLD.	PROF. HAWTHORNE.	PROF. EMERY.
8:00 to 8:45	Logic		
9:00 to 9:45	Mental Philosophy.	Latin Preparatory.	Calculus.
8:45 to 10:30	Political Economy.	Latin Junior.	Int. Math.
11:15 to 12	English Grammar.	English Grammar.	Eng. Grammar.
1:45 to 2:30	Analytical Chemistry & Agriculture.	Greek.	Junior Math.
2:30 to 3:15		Fruit Cult. & Botany.	Prep. Math.
8:15 to 4	Gen'l Chemistry.	German.	Nat. Philosophy

3·C
8

3rd biennial

REPORT

OF THE

THE LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

State Agricultural College,

LOCATED AT

CORVALLIS, OREGON.

TENTH REGULAR SESSION—1878.

1857

SALEM, OREGON:
MART. V. BROWN, STATE PRINTER
1878.

3rd biennial

REPORT

OF THE

State Agricultural College,

LOCATED AT

CORVALLIS, OREGON.

TENTH REGULAR SESSION—1878.

1857

SALEM, OREGON:
MART V. BROWN, STATE PRINTER.
1878.

3rd BIENNIAL REPORT

OF THE

State Agricultural College

To His Excellency,
Gov. Chadwick,
Salem, Oregon:

SIR:—I have the honor to submit the third biennial report of the Agricultural Department of Corvallis College.

I regard this school as now in full and successful operation, as far as this is possible with the present resources. The following is the course of study adopted by the Legislature of 1872:

COURSE OF STUDIES.

PREPARATORY CLASSES.

Mathematics—Arithmetic and Algebra.

English—Reading, Spelling, Geography, English Grammar, Penmanship, Composition, Elocution, History of United States.

Natural Science.—Natural History, Philosophy, Physiology.

Languages—Latin Grammar, Latin Reader, Greek Reader, Greek Grammar, French Grammar and Reader, German.

Military Exercises—Tactics, Drill.

Agriculture—Practical Instruction on Farm.

FRESHMAN CLASS.

Mathematics—Algebra, Geometry.

English—Rhetoric, Composition, History, Book-keeping.

Natural Science—Inorganic and Organic Chemistry, Qualitative Analysis, Structure and Physiology of Plants, Water, Atmosphere and Soil in their relation to vegetable production, Meteorology, Zoology, Botany, Physical Geography.

Languages—Ancient Geography, Roman Antiquities, Virgil, Cicero, Greek Antiquities, Greek Testament, Homer, French, German.

Agriculture—Theory and Practice of Agriculture, Principles of Tillage, Drainage, Landscape Gardening.

Military—Tactics, Drill.

Excursions—Botanical and Zoological.

SOPHOMORE CLASS.

Mathematics—Trigonometry, (plane and spherical), Navigation, Mensuration, Surveying, Drawing, Maps of Farms, etc.

English—Rhetoric, Logic, Composition, Elocution, Book-keeping, Universal History.

Natural Science—Analysis of Minerals, Ores, Soils, Manures, Ashes of Plants, Mineral Waters, etc., etc., Practice in Mineralogy, Entomology, Geology, Botany.

Languages—Roman and Greek Antiquities, Sallust, Horaces' Odes and Epodes, Greek Testament, Homer, French, German.

Agriculture—Theory and practice of Agriculture, Horticulture, Farm Implements and Drainage, Stock-breeding.

Excursions—Geological and Botanical.

JUNIOR CLASS.

Moral Philosophy—Evidence of Natural and Revealed Religion, Moral Philosophy, (ethics), Political Economy.

Mathematics—Analytical Geometry, Differential and Integral Calculus, Practical Surveying and Engineering.

English—Mental Philosophy, English Literature.

Natural Science—Qualitative and Quantitative Analysis, Mineralogy, Chemistry, (general), Geology, Organic Analysis.

Languages—Livy, Horace's Satires, Epistles, etc., Odyssey, De Corona, Latin and Greek Composition, French, German.

Agriculture—Theory and practice of Agriculture, Training and Culture of Fruit Trees, the Vine, Small Fruits, Culture of Flowers.

Military—Tactics and Drill.

SENIOR CLASS.

Moral Philosophy—Evidence of Natural and Revealed Religion—continued.

Mathematics—Mechanics, Astronomy, Civil Engineering.

Natural Science—Chemistry, completed, Quantitative Analysis.

Languages—Juvenal, Cicero, Tacitus, Alcestis, (Euripides), Thucydides, Demosthenes.

Agriculture—Theory and Practice of Agriculture, Laying out of Lawns, Ornamenting Grounds, etc.

Military—Tactics, Drill.

From this list of studies we selected, classified and arranged such as we thought most important. We distributed them into schools as follows:

I. School of Mathematics.
II. School of Languages (ancient).
III. School of Languages (modern).
IV. School of Chemistry.
V. School of Natural Philosophy.
VI. School of Moral Philosophy.
VII. School of Agriculture.
VIII. School of History and Literature.

The special report of each teacher will show how this work is divided among the teachers.

I. SCHOOL OF CHEMISTRY.

B. L. ARNOLD, TEACHER.

This school has three classes :

a. General Chemistry.
b. Analytical Chemistry.
c. Chemical Philosophy.

a. GENERAL CHEMISTRY.

Here the student studies :

1. The general principles of Chemical Physics.
2. History, Properties and Classification of the Elements and their Compounds.
3. The Carbon Compounds.

b. ANALYTICAL CHEMISTRY.

Here the student learns to separate and classify the more common metals according to the method of Elliot &

Storer. He then studies the salts by the same method, and lastly learns to treat the more refractory oxides and applies his knowledge to agricultural analysis and to the identification of ores, etc.

c. CHEMICAL PHILOSOPHY.

Here are taught:

1. The Science of Chemistry.
2. Chemical Problems.

Under the Science of Chemistry come the investigation of the atoms as to weight, their relations to light, heat, electricity, polarity, the form of molecules; also other relative matter.

AGRICULTURAL CHEMISTRY.

Here the student studies the following subjects, viz.:

1. The origin of the various soils, their physical and chemical character.
2. The methods of preparation for crops.
3. The means for preventing the deterioration of soils.
4. The means used to restore worn soils.
5. The sources, management and action of manures.
6. Meteorology in relation to crops.
7. The application of crops to feeding cattle.

There are other kindred subjects, but these occupy the greater part of the student's time.

In order to beget a habit of observation, and to cultivate in the student a taste for farming and its interests, I have adopted the following plan: I put into the student's hands certain seeds and require such experiments with them as I deem best. The thing is new, and I have succeeded but partially, but hope to succeed fully during the coming year. I append the reports of these students below; only few have rendered reports, certain unavoidable circumstances rendering it difficult for me to procure them. (For these reports, see end of the general report.)

SCHOOL OF MORAL PHILOSOPHY.

B. L. ARNOLD, TEACHER.

There are three classes here also:

a. Logic, Psychology and their applications to Ethics, Rhetoric, Political Economy and Sociology.

b. Methods of Science.

c. History of Philosophy.

After the student has become acquainted with the Methods of Science, he pursues the study of Mental Science still further.

NATURAL PHILOSOPHY.

A portion of this subject is, for the present, assigned to me, viz.: The Analytical Physics of Heat, Light and Electricity.

REMARK.—All along through my departments the subjects are so arranged that each higher subject requires a review of each lower.

I find it best, in general, to confine the student to one text book till he has acquired a fair acquaintance with the principles which he is studying, correcting any inaccuracies by reference to the authorities upon the subject.

Students must understand Algebra and Geometry before they can enter my classes.

The students of my classes and of the entire school have aided us in discipline by their gentlemanly deportment.

B. L. ARNOLD.

SCHOOL OF LANGUAGES.

B. J. HAWTHORNE, TEACHER.

President B. L. Arnold:

SIR:—I have the honor to present the following biennial report of this department:

It is the aim here to teach Language as a science; to explain its laws and construction.

ENGLISH.

This language is rapidly spreading over the entire globe. An educated man, whatever his nativity, must know English.

It has been well said that the graduates of a college are judged by the public more particularly with reference to their English scholarship than to any other part of their educational attainments.

The elements of the language are studied, sentences are analyzed and every effort is made to understand the meaning of the author. The difficulties of the language lead back to the

ANGLO-SAXON.

Here the student commences at the beginning and builds upon a deep foundation.

TEXT BOOKS.

Whitney's English Grammar, Life and Growth of Language, Shakespeare, March's Anglo-Saxon Grammar and Reader.

GERMAN.

Whitney's Grammar, Reader, Deutsche Grammatik

(Heyse), Goethe, Schiller, and other standard authors. Whitney's Dictionary.

FRENCH.

Grammar, Otto, Keetel, DeFivas' Reader, Joyne's Plays, and Telemaque. Exercises. Dictionaries: Spiers and Lurenne, Gasc.

LATIN.

Introductory—Gildersleeve's Grammar, Reader and Exercise Book.

Junior—Cæsar, Virgil, Cicero de Senectute and Exercises.

Intermediate—Horace, Livy, Cicero's Orations and Exercises.

Senior—Cicero de Officiis, Persius, Tacitus and Exercises.

The Chase & Stuart edition of Latin Authors. Leverett's Latin Lexicon. Long's Classical Atlas.

GREEK.

Introductory—Grammar (Kuehner's, Hadley's), Harkness's First Book and Xenophon's Anabasis (Kendrick's).

Junior—Herodotus, Xenophon's Memoriabilia.

Intermediate—Demosthenes, Plato, Homer, Exercises.

Senior—Thucydides, Sophocles, Exercises. Kuehner's Large Grammar. Liddell & Scott's Lexicon.

In addition to the above I teach

FRUIT CULTURE.

Text Book—Downing's Selected Fruits.

The leading subjects are :

1. Production of new varieties of fruit.
2. Duration of varieties.

3. Propagation of varieties, grafting, budding layers and suckers.
4. Pruning.
5. Transplanting.
6. General remarks on insects.
7. The best varieties of apples, cherries, pears, currants, gooseberries, grapes, peaches, melons, raspberries, blackberries, strawberries and plums.

BOTANY.

Text Books—Gray's How Plants Grow. New Manual of Botany.

The structure of plants, their nature and habits, and the principles by which they are classified, are studied. Plants are analyzed in the class-room and arranged according to the NATURAL SYSTEM.

Particular attention is given to the grass family, including, besides the true grasses, wheat, barley, rye, oats, rice and Indian corn.

The unremitting zeal and uniform courtesy of the students in my department go far to make the teacher's work a labor of love.

Very respectfully,
B. J. HAWTHORNE.

AUGUST 1, 1878.

SCHOOL OF MATHEMATICS.

JOSEPH EMERY, TEACHER.

The course is divided into :

JUNIOR CLASS.

Algebra and Geometry completed, Trigonometry, Surveying and Engineering.

INTERMEDIATE CLASS.

Analytical Geometry, Descriptive Geometry, Differential Calculus.

SENIOR CLASS.

Integral Calculus, Mechanics and Astronomy.

Special attention is given to the mental development of the student, and the discipline of his intellectual powers for which the study of Mathematics is pre-eminently adapted.

The practical utility of this branch of science is constantly impressed upon the student, and as far as possible taught and illustrated by some useful application in the field of practical life.

Lectures are given on the Logic of Mathematics, pointing out and comparing the two methods of reasoning *analytical* and *synthetical.*

The adjustment of the compass and theodolite is fully explained and illustrated by field practice in surveying and engineering.

Text Books—Olmstead, Davies and Olney, Courtney and Todhunter for reference.

Also taught by Professor of Mathematics.

GEOLOGY AND MINERALOGY.

Text Books—Dana and LaConte, and in the School of Agriculture.

Stock breeding by a course of lectures.

A large and varied collection of valuable minerals and Gelogical specimens have been added to the Laboratory during the past year. These have been mainly secured by the private means of the teacher in Geology and Mineralogy, and have greatly facilitated instruction in this department.

We earnestly solicit contributions to our Cabinet from friends of education throughout the State.

GRADUATES.

1870.

James K. P. Currin, B. S.	Cottage Grove
Robert McVeatch, B. S.	Cottage Grove

1871.

George F. Burkhart, B. S.	Lebanon
H. McN. Finley, B. S.	Corvallis
James D. Fountain, B. S.	Jacksonville
W. R. Privett, B. S.	Corvallis

1872.

Thomas B. Alexander, B. S.	Benton County
John Eglin, B. S.	Benton County
Alonzo J. Locke, B. S.	Corvallis
James K. P. Weatherford	Linn County

1873.

Leander N. Liggett, B. S.	Albany
William F. Herrin, B. S.	Jacksonville
Oscar L. Isom, B. S.	Baker City

1874.

John R. Bryson, B. S.	Brownsville
Thomas H. Crawford, B. S.	Norton's
Emmet H. Taylor, B. S.	Corvallis

George A. Grimes	Harrisburg
William C. Crawford	Norton's

1875.

Reuben A. Fuller, B. S	Corvallis
Philip E. Linn, B. S	Eagle Creek

1876.

Franklin Cauthorn, A. M	Corvallis
Isaac Jacobs, B. S	Corvallis
George P. Lent, B. S	East Portland
Newton A. Thompson, B. S	Benton County

1878.

S. Thomas Jeffreys, A. B	Independence
Frederick W. Vincent, B. S	Corvallis
Elvin J. Glass, B. S	Corvallis
Moses Neugass, B. S	Corvallis

Following is the list of students. Many of them attended the whole of the last two years:

NAME.	APPOINTED FROM.
Alfred Bennett	Wasco and Lake
George E. Bentley	Benton
J. A. Booth	Yamhill
W. O. Booth	Yamhill
Wm. R. Bryson	Coos and Curry
N. Burch	Polk
Alonzo Carlile	Benton
Orville E. Carter	Grant

Luther Caton	Jackson
Arthur J. Chapman	Josephine
Elmer E. Charman	Clackamas
H. French Chrisinger	Linn
Virgil A. Davis	Linn
Arthur Doolittle	Clackamas
Dayton Elliott	Benton
Marion R. Elliott	Benton
Clarence Ford	Umatilla
Holt D. Gaines	Linn
Millard F. Geiger	Washington
Elvin J. Glass	Washington
Edgar Grimm	Grant
Ernest D. Holgate	Benton
Willard W. Holgate	Washington
Thomas Holland	Coos and Curry
Daniel Holman	Linn
William H. Holman	Linn
Thomas H. Horning	Benton
Jesse J. Houck	Benton
Joel Howton	Linn
Ira Hunter	Josephine
S. Thomas Jeffreys	Benton
Benjamin R. Job	Benton
Henry W. Keesee	Benton
Charles L. Lambert	Linn
A. S. Locke	Polk
William Y. Masters	Multnomah
Albert Mercer	Marion
J. C. K. McCann	Lane
S. G. McCann	Lane
William A. McCullough	Benton
James Alex. McFadden	Polk

Charles H. Moore	Benton
Moses Neugass	Yamhill
David A. Osburn	Yamhill
Wm. W. Randall	Union
Charles Rideout	Linn
William Ross	Linn
Wm. A. H. Shields	Linn
George W. Simpson	Benton
B. T. Soden	Grant
George Sutherlin	Linn
Frederick W. Vincent	Multnomah
John Walker	Benton
Ernest White	Multnomah
John W. Will	Linn
Walter T. Wilds	Benton
James O. Wilson	Josephine
Samuel M. Wood	Jackson
Ralph E. Wrenn	Linn
Fred. L. Wright	Multnomah
William E. Yates	Linn

Total, 61.

WEATHER RECORD, EXPERIMENTS WITH SEEDS, WHITE SOIL, ETC.

The following are the experiments referred to as conducted by students:

REPORT OF MR. MARION ELLIOT.

Soil.

The seeds were sown in common grey soil (clay) which had been in cultivation for twenty years.

Results.

8 lbs Touzelle Wheat, sown April 21, yielded......	144 lbs.
6 lbs Chevalier Barley, sown April 21, yielded.....	94 lbs.
2 lbs White Dutch Oats, sown April 21, yielded...	174 lbs.

REPORT OF MR. DAYTON ELLIOT.

Soil.

The soil was a dark loam, abounding in humus, which had been in cultivation for three years.

Results.

4 lbs Touzelle Wheat, sown April 23, yielded......	73 lbs.
4 lbs Chevalier Barley, sown April 23, yielded.....	45 lbs.
2 lbs White Dutch Oats, sown April 23, yielded...	45 lbs.

REPORT OF MR. THOMAS HORNING.

I give his report upon garden seeds, his report on grain being similar to those above.

Soil.

The soil on which seeds were planted was heavy loam without manure.

Results.

The Mangel Wurzel seeds were planted in rows three feet apart and one hundred feet long, the distance between the plants in the rows being five inches; these yielded eleven bushels to the row.

The Sugar Beet seeds were planted in the same manner and produced nine bushels to the row. The beets did not stop growing till the middle of December.

The Melon seeds (Pine Apple) did not come up.

The cabbage (Large Flat Dutch) did well.

WHITE SOIL.

Some of our farmers have consulted me about this soil. I see no reason to change my former views, which were published in a previous report.

B. L. ARNOLD.

WEATHER RECORD.

STATE AGRICULTURAL COLLEGE,
CORVALLIS, Oregon.

Latitude, about 44° 33′.

Longitude, about 123° 15′.

Monthly Record of Temperature and Rainfall from Nov. 18, 1877, to July 31, 1878.

	THERMOMETER.			RAINFALL.
	Maximum	Minimum	Mean.	
November	60	25	42	.50
December	58	20	39	4.86
January	55	20	37	5.66
February	60	34	47	9.65
March	67	32	50	5.61
April	71	31	51	1.18
May	80	34	57	.63
June	92	42	67	.13
July	79	53	66	.39

Highest temperature June 6th, 92°.

Lowest temperature Dec. 31st and Jan. 6th, 20°.

Total rainfall since Nov. 18th, 28.61 inches.

OF THE
UNIVERSITY OF ILLINOIS

BIENNIAL REPORT

OF THE

State Agricultural College,

LOCATED AT

CORVALLIS, OREGON.

ELEVENTH REGULAR SESSION—1880.

SALEM, OREGON:
W. P. KEADY, STATE PRINTER.
1880.

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CALENDAR FOR 1880-1881.

September 1, 1880,	Session begins.
December 1, 1880,	Second Term begins.
March 1, 1881,	Third Term begins.
June 1, 1881,	Commencement Day.

BIENNIAL REPORT.

To His Excellency, Gov. Thayer, Salem, Oregon:

SIR:—I have the honor to submit the fourth annual report of the gricultural College.

The last Legislature made an important change in the condition of his institution. Previously the college had been supported chiefly by n annual appropriation of five thousand dollars; this was cut off by he last legislature, and the college was thrown upon the interest of he Agricultural College Land Fund for its support. The uncertain ondition of this fund as to amount and availability, rendered it doubtul whether the institution could be sustained or not; but by rescindng every expenditure beyond such as were absolutely necessary to eep the school alive, we have succeeded in keeping clear of debt and re pleased to say that our July interest, has paid all outstanding warants and left a handsome surplus in the treasury; and as matters now tand, if the legislature would give us some twelve hundred dollars a ear we could add it to this surplus and employ an additional professor, nd this would greatly increase the efficiency of the school. I desire ome change in the manner of appointing students to the college. It best to permit the faculty to appoint a certain number from each ounty and not trouble the senators with the matter.

The school has been well attended during the last two years, and it gratifying to say that there have been no cases of discipline.

I give here the course of study adopted by the legislature in 1872.

PREPARATORY CLASSES.

Mathematics—Arithmetic and Algebra.

English—Reading, Spelling, Geography, English Grammar, Penanship, Composition, Elocution, History of the United States.

Natural Science.—Natural History, Philosophy, Physiology.

Languages.—Latin Grammar, Latin Reader, Greek Reader, Greek rammar, French Grammar and Reader, German.

Military Exercises.—Tactics, Drill.

Agriculture.—Practical Instruction on the Farm.

FRESHMAN CLASS.

Mathematics—Algebra, Geometry.

English—Rhetoric, Composition, History, Book-keeping.

Natural Science—Inorganic and Organic Chemistry, Qualitative Analysis, Structure and Physiology of Plants, Water, Atmosphere and Soil in their relation to vegetable production, Meteorology, Zoology, Botany, Physical Geography.

Languages—Ancient Geography, Roman Antiquities, Virgil, Cicero, Greek Antiquities, Greek Testament, Homer, French, German.

Agriculture—Theory and Practice of Agriculture, Principles of Tillage, Drainage, Landscape Gardening.

Military—Tactics, Drill.

Excursions—Botanical and Zoological.

SOPHOMORE CLASS.

Mathematics.— Trigonometry, (plane and spherical) Navigation, Mensuration, Surveying, Drawing, Maps of Farms, etc.

English.—Rhetoric, Logic, Composition, Elocution, Book-keeping, Universal History.

Natural Science—Analysis of Minerals, Ores, Soils, Manures, Ashes of Plants, Mineral Waters, etc., etc., Practice in Mineralogy, Entomology, Geology, Botany.

Languages—Roman and Greek Antiquities, Sallust, Horaces' Odes Epodes, Greek Testament, Homer, French, German.

Agriculture.—Theory and Practice of Agriculture, Horticulture, Farm Implements and Drainage, Stock-breeding.

Excursions.—Geological and Botanical.

JUNIOR CLASS.

Moral Philosophy—Evidence of Natural and Revealed Religion, Moral Philosophy, (ethics), Political Economy.

Mathematics.—Analytical Geometry, Differential and Integral Calculus, Practical Surveying and Engineering.

English.—Mental Philosophy, English Literature.

Natural Science.—Qualitative and Quantitative Analysis, Mineralogy, Chemistry, (general), Geology, Organic Analysis.

Languages.—Livy, Horace's Satires, Epistles, etc., Odysey, De Corona, Latin and Greek Composition, French, German.

Agriculture.—Theory and Practice of Agriculture, Training and Culture of Fruit Trees, the Vine, Small Fruits, Culture of Flowers.

Military.—Tactics and Drill.

SENIOR CLASS.

Moral Philosophy.—Evidence of Natural and Revealed Religion—continued.

Mathematics.—Mechanics, Astronomy, Civil Engineering.

Natural Science.—Chemistry, completed, Quantitative Analysis.

Languages.—Juvenal, Cicero, Tacitus, Alcestis, (Euripides), Thucydides, Demosthenes.

Agriculture.—Theory and Practice of Agriculture, Laying out of lawns, Ornamenting Grounds, etc.

Military.—Tactics, Drill.

From this list of studies we selected and classified such as our teaching force would suggest as most important. We distributed them into schools as follows:

I. School of Mathematics.
II. School of Language (ancient).
III. School of Language (modern).
IV. School of Chemistry.
V. School of Natural Philosophy.
VI. School of Moral Philosophy.
VII. School of Agriculture.
VIII. School of History and Literature.

The Special report of each teacher will show how this work is divided among the teachers.

I.—SCHOOL OF CHEMISTRY.

B. L. ARNOLD, TEACHER.

This school has three classes:

a. General Chemistry.
b. Analytical Chemistry.
c. Agricultural Chemistry.

a. GENERAL CHEMISTRY.

Here the student studies:

1. The General Principles of Chemical Physics.
2. History, Properties and Classification of the Elements and their Compounds.
3. The Carbon Compounds.

b. ANALYTICAL CHEMISTRY.

Here the student learns to separate and classify the common metals according to the method of Elliot & Storer. He then studies the salts by the same method, and lastly, learns to treat the more refractory oxides, and applies his knowledge to agricultural analysis and the identification of ores, &c. Chemical Philosophy is all along taught and the solution of chemical problems forms a prominent feature of the course.

c. AGRICULTURAL CHEMISTRY.

Here the student studies the following subjects:

1. The origin of the various soils, their physical and chemical characters.
2. Methods of preparation for crops.
3. The means of preventing the deterioration of soils.
4. The means used to restore worn soils.
5. The sources, management and action of manures.
6. Meteorology in its relation to crops.
7. The application of crops to feeding.
8. General farm economy.

II.--SCHOOL OF NATURAL PHILOSOPHY.

B. L. ARNOLD, TEACHER.

Here the student applies himself to the subject of matter as effected by force.

The subject includes, Kinematics, Kinetics, Energy, Undulations, Motion and Equilibrium, and the application of the principles here developed to Light, Heat, Electricity, and Sound. These subjects are taught in the light of the principle of Conservation of Energy.

III.—SCHOOL OF MORAL SCIENCE.

B. L. ARNOLD, TEACHER.

This school includes:

1. Logic.
2. Psychology.
3. Mental Philosophy.
4. The Application of the principles of these sciences to Ethics, Rhetoric, Political Economy and Sociology.

All along through the course the subjects are so arranged, that each higher study requires a review of lower principles.

I find that it is necessary to have students study Algebra and Geometry before they enter upon any of the subjects in my departments.

It is highly gratifying to me to state that the students have greatly aided me in discipline by their gentlemanly deportment.

EXPERIMENTS.

So limited have been our means and so uncertain the amount of money which we should receive, that it has been impossible to do any thing beyond giving analysis of experiments. Accordingly, I have afforded the classes in agriculture fine opportunities to study the experiments of Lawes and Gilbert, and many others.

Experimenting to be of any benefit and value must extend over several years; and should there be a regular supply of funds in sufficient amount, we propose to enter upon experiments to test the value of fallowing land, of rotation of crops, to ascertain what grasses and clovers are best suited to Oregon, and other kindred subjects. I call attention to some investigations of Prof. Hawthorne in relation to Lucerne; should his observations be correct, the State will derive immense benefit from his labors in this field.

The subject of fertilizers is an important matter and one that should early occupy the attention of our farmers. So far as I have traveled along the sea coast, I have made observations to ascertain the extent of marl in the State, at least on the sea coast of the State, and I find that there is marl of excellent quality and in some quantity which will be of great value, as soon as there shall be railroad communication with the coast.

THE MECHANICAL DEPARTMENT.

We are making arrangements to open this department at an early day, and have a young man preparing to take charge of it. We fully recognize its importance. Very respectfully,

B. L. ARNOLD.

SCHOOL OF MATHEMATICS.

JOSEPH EMERY, TEACHER.

President, B. L. Arnold:

SIR:—I have the honor to present the following biennial report of this department:

The course is divided into four classes:

FRESHMAN.

Higher Algebra and Geometry.

SOPHOMORE.

Trigonometry, Surveying and Engineering.

JUNIOR.

General Geometry and Differential Calculus.

SENIOR.

Integral Calculus, Mechanics and Astronomy.

Special attention is given to the mental development of the student, and the discipline of his intellectual powers, for which the study of Mathematics excels all others.

The practical utility of this branch of science is constantly impressed upon the student, and as far as possible taught and illustrated by some useful application in the field of practical life. Lectures are given on the history of Mathematics, and the two methods of reasoning, analytical and synthetical, explained.

The adjustment of the compass and theodolite is fully explained by field practice in Surveying and Engineering.

Text-books—Olmstead, Davies and Olney, and Courtney and Todhunter for reference.

In addition to the above, I have taught Geology and Mineralogy. Text-books—Dana and LaConte. And in the

SCHOOL OF AGRICULTURE

Zoology and stock-breeding. I delivered a course of lectures, extending through the entire year, on Domestic Animals; their Origin, Utility, Methods of Improving and Taking Care of Stock, etc. etc.

These lectures were attended by all the agricultural students in the Collegiate Department.

CABINET.

A large number of geological and mineralogical specimens have been added to our Cabinet during the last two years, greatly facilitating class-room work in this department.

We earnestly solicit contributions to our Cabinet from friends of education throughout the State. Very respectfully,

July 28th, 1880. JOSEPH EMERY.

BOTANY, FRUIT CULTURE, AND LANGUAGES.

B. J. HAWTHORNE, TEACHER.

President B. L. Arnold:

SIR:—I have the honor to present the following biennial report of this department:

Botany has been taught by means of text-books and lectures. For illustration, Oregon plants, as far as possible, are brought before the classes. The students are urged to become familiar with the plants of our own State—those by which they are continually surrounded.

All the information on grasses, that can be had, is used. Which grass is best adapted to a given locality; which is most nutritious; which is best for grazing; which for hay. Some experiments have been made in order to ascertain whether any grass will remain green in the Willamette valley, throughout the entire summer and fall. Thus far, Alfalfa (Lucerne, Medicago Sativa) has stood the test. It is as green in midsummer as it is in May. In good rich loam it grows five feet high, and it will stand several mowings during one season. The fodder is of a good quality for stock. Provision has been made for more extensive experiments with grasses during the following year.

The different kinds of wheat, oats, and corn will be tested.

Text Books: Gray's series.

From studying the general principles and habits of plants, we pass to the special subject of

FRUIT CULTURE.

Methods of producing, cultivating, and preserving fruit trees now engage our attention. Which fruits are best adapted to our State? How can they be made most profitable? Shall we raise all wheat and no fruit? These are some of the questions arising.

It is proposed to have each member of the class practice grafting, budding, cross-breeding, transplanting, and pruning, and observe the results. If a tree begins to decline, try to learn the cause and apply the remedy.

Text Book: Downing's Selected Fruits.

SCHOOL OF LANGUAGE.

This school is divided into two departments:
A.—Ancient Language.
B.—Modern Language.

LATIN.

Introductory Class.—Grammar, Reader, Exercise-book.
Junior.—Cæsar, Virgil, Cicero de Senectute, Exercises.
Intermediate.—Horace, Livy, Cicero's Orations, Exercises.
Senior.—Cicero de Officiis, Persius, Tacitus, Exercises.

GREEK.

Introductory.—Grammar, Xenophon.
Junior.—Herodotus, Xenophon.
Intermediate.—Demosthenes, Plato, Homer, Exercises.
Senior.—Thucydides, Sophocles, Exercises.
Grammar, Greek.—Goodwin's Liddell and Scott's Lexicon.
Latin.—Gildersleeve's Grammar and Exercise-book. Freund's Leverett's Lexicon.

Gradution in Latin is necessary for B. S.

Graduation in Latin and Greek is necessary for A. B.

B—MODERN LANGUAGE.

This course comprehends French, German, and Anglo-Saxon.

1. *German.*—Whitney's Grammar and Reader; besides the Reader, such authors and parts of authors will be read as the teacher may deem fit.

2. *French.*—DeVere's Grammars and Readers; besides Readers, such authors and parts of authors will be read as the teacher may deem fit.

3. *Anglo-Saxon.*—Grammar, March; Reader, March; Corson's Hand-book.

Graduation in German and Anglo-Saxon is required for the degree of A. M., in addition to graduation in the Ancient Languages.

SCHOOL OF HISTORY AND LITERATURE.

1. *History.*—History, of Greece, of Rome, of England, of the United States.

2. *Literature.*—History of the English Language and Literature; English Grammar; a portion of Æsthetics; Anglo-Saxon form of Literature.

Text-Books.—Smith's Smaller Histories of Greece and Rome; Smith's Student's Gibbon's Decline and Fall, and the Student's Hume's History of England, by the same author; Taylor's Manuel of Modern History.

Text-Books in Literature.—Kame's Criticism; Brown's English Grammar; Hart's English Literature and American Literature; Shakespeare; Corson's Hand-book of Early English; Sprague's English Literature; Whitney's English Grammar, Life and Growth of Language.

Very respectfully,
B. J. HAWTHORNE.

GRADUATES.

1870.

James K. P. Currin, B. S	Cottage Grove.
Robert McVeatch, B. S	Cottage Grove.

1871.

George F. Burkhart, B. S	Lebanon.
James D. Fountain, B. S	Jacksonville.
W. R. Privett, B. S	Corvallis.

1872.

Thomas B. Alexander, B. S	Benton County.
*John Eglin, B. S	Benton County.
Alonzo J. Locke, B. S	Corvallis.
James K. P. Weatherford, B. S	Linn County.

1873.

Leander N. Liggett, B. S	Albany.
William F. Herrin, B. S	Jacksonville.
Oscar L. Isom, B. S	Baker City.

1874.

John R. Bryson, B. S	Brownsville.
Thomas H. Crawford, B. S	Norton's.
Emmet H. Taylor, B. S	Corvallis.
George A. Grimes	Harrisburg.
William C. Crawford	Norton's.

1875.

Reuben A. Fuller, B. S	Corvallis.
Philip E. Linn, B. S	Eagle Creek.

1876.

Franklin Cauthorn, A. M.	Corvallis
*Isaac Jacobs, B. S.	Corvallis
George P. Lent, B. S.	East Portland
Newton A. Thompson, B. S.	Benton County

1878.

S. Thomas Jeffreys, A. B.	Independence
Frederick W. Vincent, B. S.	Corvallis.
Elvin J. Glass, B. S.	Corvallis.
Moses Neugass, B. S.	Corvallis.

1879.

*Ernest White, A. M.	Albany.
Bartholomew T. Soden, B. S.	Hubbard.
Marion Elliott, B. S.	Corvallis.
Dayton Elliott, B. S.	Corvallis.

1880.

William E. Yates, A. M.	Corvallis.
Shubel G. McCann, A. B.	Corvallis.
Edgar Grimm, B. S.	Marion County.

*Deceased.

LIST OF STUDENTS.

Following is the list of students. The most of them attended the whole of the last two years:

Morris Allen.
William W. Baker.
William B. Bell.
Charles L. Bennett.
E. H. Bennett.
William L. Bradshaw.
Vineyard C. Brock.
Andrew S. Buchanan.
William A. Buchanan.
Alonzo Carlile.
Orville E. Carter.
J. Luther Caton.
Arthur J. Chapman.
E. Elmer Charman.
Thomas L. Charman.
Albert E. Cook.
Orville Cone.
William D. Casteel.
Virgil A. Davis.
T. H. Davis.
John Davis.
William Davis.
Edwin L. Davis.
George R. Dedman.
George F. Eglin.
Dayton Elliott.
Marion Elliott.
William G. Emery.

James Ferguson.
Edgar Grimm.
Henry G. Hastings.
Thomas J. Henkle.
A. T. Hershner.
Arthur E. Holgate.
William Holman.
George Hovenden.
Baxter F. Howard.
Jefferson D. Howard.
Leroy Humphreys.
Ira Hunter.
Charles Horning.
John Jenkins.
Benjamin R. Job.
J. P. Johnson.
George Klaggett.
Charles L. Lambert.
Plutarch Lewis.
George Lily.
Isaac Looney.
W. York Masters.
Shubel G. McCann.
James A. McFadden.
Alfred Matthieu.
E. M. Mays.
Albert Mercer.
John F. Montgomery.
Harry McConnell.
Edwin Newton.
David A. Osburn.
Henry Owens.
Franklin Priest.
William W. Randall.
Michael Rickard.
William Rickard.
A. Harding Roberts.
William Robnett.
George W. Simpson.
Bartholomew T. Soden.
Jessee D. Stearns.
Leo Stock.
Richard Taylor.
Columbus M. Tetherow.
Ferdinand Tracy.
James Trafzer.
Aaron Vinson.
John Walker.
B. F. Watkins.
R. A. Williamson.
J. H. Wilson.
James O. Wilson.
John W. Will.
Hiram A. Wood.
Charles L. Wood.
Samuel M. Wood.
Jasper N. Wood.
Ernest White.
Fred L. Wright.
William E. Yates.

Total........ .... 88.

WEATHER RECORD.

STATE AGRICULTURAL COLLEGE,
CORVALLIS, OREGON.

Latitude, about 44 deg. 33 min. Longitude, about 123 deg. 15 min.

Monthly Record of Temperature and Rainfall for the Year 1879.

THERMOMETER.				
MONTH.	Maximum.	Minimum.	Mean.	Rainfall inches.
January	46	19	32.5	2.00
February	52	25	33.5	5.92
March	66	32	49.0	7.31
April	67	32	49.5	2.40
May	72	36	54 0	4.38
June	73	42	57.5	.14
July	90	47	68.5	.50
August	83	48	65.5	1.03
September	84	42	63.0	1.50
October	64	32	48.0	2.00
November	55	22	38 0	4.75
December	56	8	32.0	4.50

Hottest day, July 26th—90 deg.
Coldest, December 23d—8 deg.
Rainfall for the year—36.40 inches.

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1882.

CALENDAR FOR 1882–1883.

September 4, 1882,	Session begins
December 1, 1882,	Second Term begins
March 1, 1883,	Third Term begins
June 4, 1883,	Meeting Board of Trustees
June 6, 1883,	Commencement Day

BIENNIAL REPORT.

To His Excellency, Gov. W. W. Thayer:

Sir:—I have the honor to submit the following Biennial Report of the Agricultural College, for the years 1881–2:

The people seem to require a fuller statement than we have heretofore given; I shall, accordingly, be more minute.

Rational Agriculture proposes to teach the young farmers of the country three things:

I. The nature, quantity and sources of plant-food.

II. The methods which have been established by experience for changing this food into plants.

III. The best uses of these plants; that is to say, how the plants can be used to produce the greatest amount of human happiness. Hence there are three distinct classes of subjects required in a complete course of Scientific Agriculture.

I. *Class first* treats of the nature, quantity and sources of Plant-food.

The sciences relative to this are:

1. Chemistry.
2. Mineralogy.
3. Geology.

These studies belonging here are distributed into three classes:

I. *Junior Class.*—The study of this class is General Chemistry (inorganic).

II. *Intermediate Class.*—General Chemistry (organic), Mineralogy, and Agricultural Chemistry.

III. *Senior Class.*—Analytical Chemistry, Agricultural Chemistry and Geology.

II. Class second treats:

1. Of the methods of changing plant-food into plants.

Here belong:

1. The methods of rendering *Potential Plant-food Actual*, or of preparing the food for the plant (such methods are, *vest*, *fallow*, *rotation*, *green crops*, *mechanical improvement*, *&c.*, &c.).
2. Drainage.
3. Botany.

4. Entomology [insects injurious to *vegetation*, and such as are use ful to man, &c.].
5. Meteorology.
6. Forestry.

These studies are distributed into three classes:

I. *Junior Class.*—Soils and methods for rendering potentia plant-food actual. Botany.
II. *Intermediate Class.*—Same subjects continued. Grasses fruit culture.
III. *Senior Class.*—Drainage, Meteorology, Entomology (incluc ing Bee Culture), Forestry.

III. Class third treats of the use of plants and considers the bes methods for such use. Here belong:

1. Harvesting and preservation of crops.
2. Stock-breeding (including Phyiology and Zoology).
3. Farm engineering (including drawing and construction of far buildings).
4. Landscape gardening.
5. Political economy.

These studies are divided into three classes:

I. *Junior Class.*—Methods of harvesting and preserving crop Farm Engineering, Phyiology.
II. *Intermediate Class.*—Drawing, Zoology and Stock-breedi in particular.
III. *Senior Class.*— Drawing, Stock-breeding, Landscape Garde ing, Political Economy.

Preparation Needed for Entering these Courses.—Algebra an Geometry and all the Elementary Courses necessary to these subjec (Geometry and Algebra).

Remark.—A course of Scientific and Literary Study is provided.

STATEMENT OF WORK DONE BY EACH TEACHER O THE SCHOOL.

The following is assigned to me:

1. Chemistry, both general and analytic.
2. Agricultural Chemistry.
3. Drainage.
4. Meteorology.
5. Physics.
6. Natural Philosophy.

7. Moral Science, including Logic, Mental Philosophy, Ethics, Political Economy.
8. Drawing (mechanical).
9. Landscape Gardening.

During the past year I have given instruction in all of these subjects except Meteorology, Drawing and Landscape Gardening. I have made such arrangements as will enable me hereafter to teach Mechanical Drawing.

BOTANY, FRUIT CULTURE AND LANGUAGES.

B. J. HAWTHORNE, TEACHER.

President B. L. Arnold:

SIR :—Following is the report of my work for the past two years :

From the great number of subjects I have to teach, it is found impossible to give that time to each separate study which is necessary in order to carry theory into practice to its fullest extent.

A multiplicity of recitations—teaching from 9 o'clock in the morning until 4 o'clock in the evening—leaves very little time for outdoor experiments and original research. For the last two years, I have taught Latin, Greek, German, Anglo-Saxon, English, Botany and Fruit Culture.

BOTANY.

My plan is to teach the subject as far as practicable with living specimens. Accordingly, I take the class into the forest and require each member to collect plants for himself—to study, to name and to preserve.

Last year the Agricultural Department at Washington, D. C., was kind enough to donate to the State Agricultural College of Oregon, a box of valuable specimens of plants, representing nearly every quarter of the globe, and numbering about one thousand.

The Census Department, also, presented a large number of beautiful specimens of wood, collected in various parts of the United States when the last census was taken. I have added about five hundred specimens of Oregon plants, which I, myself, have collected, mostly in the Willamette valley and along the sea coast, west of here. This work was done principally in vacation.

My thanks are due the authorities of the West Side Railroad for reduced rates of fare along the whole line, granted me while engaged in collecting plants. Prof. L. F. Henderson, of Portland High School, has courteously aided me in botanizing.

The students are taught that success in this department depends almost wholly upon their industry, activity and observation.

They have worked faithfully and zealously.

GRASSES.

During a part of last session, I taught a class that recited every other day on the subject of grasses. The principal kinds of grasses—those suitable for hay, those best for pasture, those that live through the winter, those that resist drought, how to prepare the land for a permanent meadow, what is the best soil for a particular kind of grass, for grasses in general, what is a good mixture of grasses for dry land, for wet land, for medium—all these questions and many others were discussed in the lecture-room.

I have plats of grasses, containing thirty-seven kinds, from which I shall save specimens and gather seeds. The seeds of grasses are kept on exhibition in the class-room; thus, the students may become familiar with the forms of the seeds.

TESTING SEEDS.

It is respectfully recommended that a seed-testing station for the State be established. In his report of 1880, that distinguished botanist, Dr. Beal, of the Michigan Agricultural College, says:

"I have found the greatest frauds in grass seeds. One of the best firms in New York sent me some seeds of grass, which were rotten or had been cooked. At another time the firm was about to buy what was called 'Bermuda grass.' The material consisted of the chaff or hulls of Bermuda grass, every one of which proved to be empty or in flower. Not one good seed was found. 'Adulterations were discovered [at a testing station in Europe], most ingenous in character, harmful in effect, and remarkable in amount.'

Enough has been done in this country to convince almost any sensible person that seed-testing stations could be made economical investments."

In a letter to an agricultural paper, a farmer states that he bought forty bushels of blue grass seeds, prepared his land well, and sowed them carefully—and not one seed came up.

I am now giving some attention to this subject of testing seeds; and I will do all that I can hereafter to prove by experiments the best plans for determining which are good seeds and which are not.

FRUIT CULTURE.

The class has been drilled in the manual operation of grafting and budding. Following are some of the points discussed: How to prepare the grafts, the age of the stocks, the right kind of buds, whether fruit-buds or wood-buds, cross-breeding, layering, training, pruning, preparation of the soil, transplanting, whether the soil of the orchard should be stirred or allowed to produce grass and weeds, without any ploughing.

BORERS.

In some parts of the State, plum borers have been killing the trees. They are similar to the common apple borers; but they do not seem to be identical with them. They work around the collars of the plum trees in Spring, and soon kill the trees. I know of no preventive against them; but the trees attacked may be examined, and the borers may be killed while at work.

FORESTRY.

Next session I will organize a class in Forestry, and make such experiments as circumstances will permit.

Respectfully submitted,
B. J. HAWTHORNE.

OREGON STATE AGRICULTURAL COLLEGE, July 21, 1882.

SCHOOL OF MATHEMATICS.

JOSEPH EMERY, TEACHER.

President B. L. Arnold:

SIR:—I have the honor to present the following biennial report of this department:

The course is divided into four classes:

FRESHMAN.

Higher Algebra and Geometry.

SOPHOMORE.

Trigonometry, Surveying and Engineering.

JUNIOR.

General Geometry and Differential Calculus.

SENIOR.

Integral Calculus, and the application of the Calculus in tracing curves, and *Astronomy*.

Special attention is given to the mental development of the student, and the discipline of his mental powers, for which the study of Mathematics excels all others.

The practical utility of this branch of science is constantly impressed upon the student, and, as far as possible, taught and illustrated by some useful application in the field of practical life.

The adjustment of the compass and theodolite is fully explained, and field practice given in Surveying and Engineering.

Text-books—Olmstead, Davies and Olney; Courtney and Todhunter for reference.

In addition to the above, I have taught Mineralogy and Geology. Text-books—Dana and LaConte. And in the

SCHOOL OF AGRICULTURE

Zoology and Stock-breeding. I have delivered annually a course of lectures on Domestic Animals; their Origin, Utility, Methods of Improving and Taking Care of Stock, etc., etc.

All the Agricultural Students in the College Department are required to attend these lectures.

CABINET.

A large number of Geological and Mineralogical specimens have been added to our Cabinet during the last two years; these have been collected principally from the Geological Strata of Oregon, at no little expense of time and travel by the teacher in this department.

We earnestly solicit contributions to our Cabinet from friends of education throughout the State.

Very respectfully,

JOSEPH EMERY.

July 18, 1882.

GRADUATES.

1870.

James K. P. Currin, B. S.	Cottage Grove
Robert McVeatch, B. S.	Cottage Grove

1871.

George F. Burkhart, B. S.	Lebanon
James D. Fountain, B. S.	Jacksonville
W. R. Privett, B. S	Corvallis

1872.

Thomas B. Alexander, B. S.	Benton County.
*John Eglin, B. S.	Benton County.
Alonzo J. Locke, B. S.	Corvallis.
James K. P. Weatherford, B. S.	Linn County.

1873.

Leander N. Liggett, B. S.	Albany.
William F. Herrin, B. S.	Jacksonville.
Oscar L. Isom, B. S.	Baker City.

1874.

John R. Bryson, B. S.	Brownsville.
Thomas H. Crawford, B. S.	Norton's.
Emmet H. Taylor, B. S.	Corvallis.
George A. Grimes.	Harrisburg.
William C. Crawford	Norton's.

1875.

Reuben A. Fuller, B. S.	Corvallis.
Philip E. Linn, B. S.	Eagle Creek.

1876.

Franklin Cauthorn, A. M.	Corvallis.
*Isaac Jacobs, B. S.	Corvallis.
George P. Lent, B. S.	East Portland.
Newton A. Thompson, B. S.	Benton County.

1878.

S. Thomas Jeffreys, A. B.	Independence.
Frederick W. Vincent, B. S.	Corvallis.
Elvin J. Glass, B. S.	Corvallis.
Moses Neugass, B. S.	Corvallis.

1879.

*Ernest White, A. M.	Albany.
Bartholomew T. Soden, B. S.	Hubbard.
Marion Elliott, B. S.	Corvallis.
Dayton Elliott, B. S.	Corvallis.

1880.

William E. Yates, A. M.	Corvallis.

Shubel G. McCann, A. B.	Corvallis
Edgar Grimm, B. S.	Marion County

1881.

Elmer E. Charman, A. B	Oregon City
T. Leonard Charman, B. S	Oregon City

1882.

William Y. Masters, A. M.	Portland

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*Deceased.

CATALOGUE OF STUDENTS.

Average each year, about sixty.

Edwin J. Abby.
James H. Alexander.
Alonzo W. Allen.
Judson Avery.
Frank Batcheller.
Henry L. Bents.
Arthur Bowersox.
Vineyard C. Brock.
Andrew S. Buchanan.
Robert G. Buchanan.
William A. Buchanan.
William G. Campbell.
Henry E. Carter.
William D. Casteel.
J. Luther Caton.
Elmer E. Charman.
T. Leonard Charman.
Benjamin F. Collins.
James H. Collins.
Charles E. Cone.
Homer Cone.
Albert E. Cook.
Edwin L. Davis.
Virgil A. Davis.
William H. Edmunds.
James L. Eglin.
Elda J. Elliott.
James Mc. Emery.
Charles W. Fisher.
Frank L. Fisher.
A. C. Ford.
David H. Glass.
R. F. Guilliam.
Burres S. Hastings.
Henry G. Hastings.
A. F. Hershner.
Arthur E. Holgate.
Isaac L. Holman.
William H. Holman.
Charles Horning.
Baxter F. Howard.
Jefferson D. Howard.
Andrew J. Hodges.
Geo. B. Hovenden.
Geo. F. Hughes.
Edwin D. Jackson.
Edgar Jackson.
Orville O. Jennings.
Judge P. Johnson.
William W. Johnson.
Andrew T. Keesee.
Herbert Kittredge.
Ernest A. Korthauer.
John Læbo.
Plutarch Lewis.
George Lilly.

eslie Lilly.
ames K. Locke.
Villiam T. Locke.
Villiam C. Logan.
saac Looney.
Villiam Y. Masters.
arney S. Martin.
rank S. Mattoon.
eorge W. Miller.
. E. Newton.
dward Palmer.
Villiam H. Powell.
rank L. Priest.
dward L. Rayburn.
oses Robnett.
Villiam Robnett.
. F. Ryals.
hester W. Skeels.
Hugh W. Simpson.
George W. Simpson.
Leo I. Stock.
Sol. Stock.
Arthur A. Stout.
Richard Taylor.
James Tratzer.
Henry Weiman.
Geo. C. Will.
Dandridge M. Williamson.
Jacob L. Williamson.
John N. Williamson.
Robert N. Williamson.
George D. Wood.
Samuel M. Wood.
Otto Wrenn.
Fred L. Wright.
Fred J. Yates.

Total .... 92.

DEGREES.

There are two degrees for Agricultural Students, that is, for such as ass the course of Agriculture.

FIRST DEGREE, B. F.—BACHELOR OF FARMING.

This degree is conferred on those who complete the course prescribed ove.

SECOND DEGREE, M. F.—MASTER OF FARMING.

This degree is conferred on such as have obtained the degree of B. ., and shall have worked on a farm under the directions of some od farmer, for two years.

Remarks.—It is not pretended that a boy who studies this course of struction will be a better farmer than a man who, though he has ver studied it, has been farming for twenty years; but it is contended at a boy who has studied the subjects here laid down, will be after enty years of farming, a better farmer than one who, though he has rmed for twenty years, has never studied this or a similar course of struction in Agriculture.

MEDALS.

THE STATE GRANGE MEDAL.

The State Grange, at its last meeting, passed the following resolution:

Resolution No. 10, by Mary J. Harris, was adopted as follows:

Resolved, That the Worthy Master of our State Grange be authorized to award a prize to the best student in the graduating class on general agriculture, to be awarded on recommendation of the committee in connection with the faculty of the State Agricultural College

The Grange of Oregon deserves great thanks from the College fo its honest efforts in behalf of its prosperity. I call attention to th following report of the Grange Committee on Examinations:

REPORT

Of the Committee appointed by the State Grange to attend the Exam inations of the Agricultural Students at the Agricultural College.

Bro. J. Minto proceeded to read the following report from the Committee appointed to visit the Agricultural College at Corvallis. Report adopted. Motion to reconsider lost:

Worthy Master, Officers and Members of the Oregon State Grange

Your committee appointed at the last annual meeting of the Orego State Grange to visit the Oregon State Agricultural College during th examinations had at the close of the school year in May last, beg leav to report: That we attended the school, and were present during th examination exercises of the Senior Class in Agriculture.

There were some half-a-dozen young men in the class, who eac read an essay on a subject connected with agriculture as a science Such as: The Formation of Soils; Geology as connected with Agr culture; Summer Fallowing and its Uses; Drainage and its Effect Rotation of Crops, or Means of Preserving Fertility; Restoring E hausted Land by Manures.

The treatment each of these respective subjects received from th student who made it his especial theme, and the answers given to th searching questions propounded to them by President Arnold and yo committee, proved to us that it was no sham work that was being don in the school. Your committee saw little sign of any local intere taken in the College, and though we received evidence of the teache being a body of devoted men, we must in candor say, we also receive the impression that they do not receive that measure of encourag ment from public interest to which their labors or their influence on society entitle them.

On the question of the schools connected with, and the practical benefit to the agriculture of our State, it did not seem to your committee to be meeting the expectations which may be justly placed upon it, and its failure in that respect we are constrained to believe, is on account of a lack of public appreciation of, and interest in it as a school of Agriculture and Mechanical Arts.

The question was asked one of the young men who graduated, "if he expected to make use of the knowledge of agriculture he had received from his studies in practical farming?" He candidly answered that he did not, and his answer seemed to be the same that most, if not all of the students in the school expected, and would themselves have given.

With a desire to probe further into this indifference to joining scientific with practical agriculture, and thus to find some guide to a suggestion for its removal, a portion of your committee brought the subject to the attention of the Oregon State Agricultural Society at its last annual meeting, in a proposition to make recommendation to a cadetship in the State Agricultural College, a prize to be awarded to the most proficient student of a district school.

During the discussion of this proposition, Bro. Apperson, State Senator for Clackamas county, informed the Society that he had been inquiring during his term of office for a youth in his own county who would accept his nomination to a cadetship in the Agricultural College, and failing to find one in Clackamas, he had taken some pains to find one in Marion county, but without success.

While this condition of indifference is manifested on the part of the general public, and the youth who are passing through the course of instruction, smile with amusement at the idea of urging scientific knowledge as an aid to practical farming;

While even members of our State Legislature use the results of instruction received at ordinary high schools, in holding up to farmers as a class for amusement the terms used to define the higher branches of mathematics in this College. There is probably not an editor connected with the agricultural press of the Pacific coast who could give at sight the correct botanical names of a dozen varieties of grains, grasses or forage plants. And while the columns of such papers are used as a means of controversy about the value and identity of grasses and grains which have long been known in general agriculture, by men grown gray and decrepit in the long and laborious process of gathering knowledge of farming, solely by personal experiment and experience, there has yet been no successful attempt made on this coast to prepare young men for the occupation of agriculture, as the lawyer is instructed in the law school, and the physician in the medical school.

Your committee are aware that in the past, the cultivation of the soil has been conducted under such favorable circumstances in the western portion of the United States, that muscular labor with the most rudimentary knowledge of natural causes has been sufficient to insure a competence to the industrious, but, believing that the youth of to-day, who devote their manhood to tillage, will, before old age overtakes them, find themselves confronted by such a question as, "How best to maintain a fertile soil, or restore an exhausted one?" no time should be lost, no reasonable effort should be spared to arm the youth of the yeomanry of this Northwest coast during their student days, with all the knowledge of scientific aids to agriculture which the best equipped schools can furnish.

We would therefore recommend, as a course of action calculated to aid in the establishment of this school (founded for the instruction of farmers and mechanics), that the membership of our Order take an interest in its management, and help to enable it to meet the requirements of such an institution, by placing themselves in communication with its faculty of teachers whenever they have a question to solve that practice may reasonably ask of science. The members of the present faculty gave assurance to your committee, that they would deem it both a pleasure to themselves and a benefit to the College, to establish and cultivate more intimate relations with practical farmers. They have been forced by experience to the conclusion that they cannot successfully unite manual labor of students with school studies, and have therefore rented the farm attachment of the College. We would recommend, however, as a means of giving practical men an opportunity to judge for themselves of the value of this College to their calling, that prizes, both honorary and substantial, be offered to graduates who best pass an examination before a committee of practical men, and that an appeal be made to the Oregon State Agricultural Society, to co-operate with the Grange for that object.

Respectfully submitted,

D. S. K. BUICK,
C. E. MOORE,
JOHN MINTO,
Committee.

The State Grange, at the request of the Faculty, appointed a committee to visit the Agricultural College during the session, and particularly during the final examination of the classes. I beg leave, most respectfully, to request that the Legislature appoint a committee for the same purpose.

EXPERIMENTING.

We are experimenting with grasses, this being both the most desirable department of experimentature for Oregon at present, in our opinion, and also the only one allowed by our means. The Commissioner of Agriculture at Washington desires the agricultural colleges of the several States to undertake a series of "co-operative experiments." These he has indicated, but we have not the means to carry them out.

MANUAL LABOR.

The Faculty of the College have not been able to enforce manual labor as yet. Students, if they labor, must be paid, and there are no funds provided for this purpose.

WORKSHOP.

The Board of Trustees, at its last meeting, appointed a committee to consider the practicability and advisability of establishing a workshop. I have not received the report of this committee.

FUNDS.

The funds of the Agricultural College are in a sound condition, all utstanding warrants being paid, and a surplus left in the treasury. should like much to get a small addition to this fund, so as to be ble to employ another teacher. This would greatly increase our fficiency.

APPARATUS.

We have apparatus for illustration of all the fundamental principles f Chemistry and Natural Philosophy. We hope to add this year a evel and seed-testing apparatus.

DONATIONS.

We acknowledge with thanks the following donations:

1. Numerous documents from Commissioner Education.
2. Documents and seeds from Commissioner of Agriculture.
3. Centennial map from Senator Slater.
4. Numerous documents from Hon. John Whiteaker.
5. Maps and volumes from Senator Grover.

6. A series of valuable reports from the Land Office at Washington.

7. A box of wood specimens from Census Office.

8. Botanical specimens from Agricultural Department, Washington, D. C.

9. The *Gazette* from the U. S. Patent Office.

10. We especially acknowledge the courtesy of our State officials and their clerks.

BIENNIAL REPORT

OF THE

PRESIDENT

OF THE

Oregon State Agricultural College

CORVALLIS, OREGON.

THIRTEENTH REGULAR SESSION.

SALEM, OREGON:
W. H. BYARS, STATE PRINTER.
1885.

REPORT

OF THE

PRESIDENT

OF THE

Oregon State Agricultural College

CORVALLIS, OREGON.

THIRTEENTH REGULAR SESSION.

SALEM, OREGON.
W. H. BYARS, STATE PRINTER.
1885.

Corvallis, Oregon,
Dec. 29, 1884.

His Excellency
Gov. Z. F. Moody,
Salem, Oregon:

Sir—I have the honor respectfully to submit the Thirteenth Biennial Report of the Agricultural College of Oregon. This I do a the request of the President of the Board of Trustees. I have no the time to make a more detailed statement, nor do I deem it necessary to do so.

Very respectfully,
B. L. ARNOLD.

REPORT.

CONCEPTION OF A PRACTICAL EDUCATION, BASED ON SCIENCE.

A practical education based on science supposes three things—viz:

1. A certain amount of instruction in science;
2. A certain amount of instruction in technological studies;
3. A certain amount of instruction in the practical application of principles.

For example, when a man farms, he applies principles to practice, and Agricultural education teaches him how to apply these principles well. Now in this case scientific education enables him to understand the principles well; technical education teaches him to apply them well; and practical education applies them. Hence, if one school must teach all this, and in addition studies in a Mechanical Department, a very large corps of teachers must be had and costly outfit must be used. Such school must have at least three faculties—(1) A Scientific and Literary Faculty; (2) A Faculty for Technical Studies; (3) a Faculty for teaching the Operations.

The law organizing the Oregon Agricultural College contemplates an institution upon the broad basis above alluded to. An attentive consideration of the following course of study will make this evident.

COURSE OF STUDY PRESCRIBED BY THE STATE.

PREPARATORY CLASSES.

Mathematics.—Arithmetic, Algebra.

English.—Reading, Spelling, Geography, English Grammar, Penmanship, Composition, Elocution, History of the United States.

Natural Science.—Natural History, Philosophy, Physiology.

Languages.—Latin Grammar, Latin Reader, Greek Grammar, Greek Reader, French Grammar and Reader, German.

Military Exercises.—Tactics, Drill.

Agricultural.—Practical instruction on Farm.

FRESHMAN CLASS.

Mathematics.—Algebra, Geometry.

English.—Rhetoric, Composition, History, Book-keeping.

Natural Science.—Inorganic and Organic Chemistry, Qualitative Analysis, Structure and Physiology of Plants, Water, Atmosphere and Soil in their relations to vegetable production, Meteorology, Zoology, Botany, Physical Geography.

Languages.—Ancient Geography, Roman Antiquities, Virgil, Cicero, Greek Antiquities, Greek Testament, Homer, French, German.

Agriculture.—Theory and Practice of Agriculture, Principles of Tillage, Drainage, Landscape Gardening.

Military. - Tactics, Drill.

Excursions.—Botanical, Zoological.

SOPHOMORE CLASS.

Mathematical.—Trigonometry, (plane and spherical), Navigation Mensuration, Surveying, Field Surveying, Drawing, Maps of Farms, Etc.

English.—Rhetoric, Logic, Composition, Elocution, Book-keeping, Universal History.

Natural Science.—Analysis of Minerals, Ores, Soils, Manures, Ashes of Plants, Mineral Waters, &c., &c.; Practice in Mineralogy, Entomology, Geology, Botany.

Languages.—Roman and Greek Antiquities, Sallust, Horace, Odes, and Epodes, Greek Testament, Homer, French, German.

Agriculture.—Theory and Practice of Agriculture, Horticulture, Farm Implements and Drainage, Stock Breeding.

Excursions.—Geological, Botanical.

JUNIOR CLASS.

Moral Philosophy—Evidences of Natural and Revealed Religion, Moral Philosophy, Political Economy.

Mathematics—Analytical Geometry, Differential and Integral Calculus, Practical Surveying and Engineering.

English—Mental Philosophy, English Literature.

Natural Science.—Qualitative and Quantitative Analysis, Mineralogy, Chemistry, Geology, Organic Analysis.

Language.—Livy, Horace's Satires, Epistles, &c.; Odyssey, De Corona, Latin and Greek Composition, French, German.

Agriculture.—Theory and Practice of Agriculture, Training and Culture of Fruit Trees, the Vine, Small Fruits, Culture of Flowers.

Military.—Tactics, Drill.

SENIOR CLASS.

Moral Philosophy.—Evidences of Natural and Revealed Religion —Continued.

Mathematical.—Mechanics, Astronomy, Civil Engineering.

Natural Science.—Chemistry—Completed; Quantitative Analysis.

Languages.—Juvenal, Cicero, Tacitus, Alcestis, Thucydides, Demosthenes.

Agriculture.—Theory and Practice of Agriculture, Laying out of Lawns, Ornamenting Grounds, &c.

Military.—Tactics, Drill.

Remark—I may remark in passing, that with the selection, arrangement, and adoption of this course of study, I personally had nothing to do.

Remark—There are, and always have been, three principal classes of people in the community, formed by their several views of Agricultural Colleges and their work. The first class regard these Colleges merely as institutions of learning, differing in no respect (or in some way important matters) from other Colleges. The second class holds that they are, or ought to be, wholly technical. The third considers them as mere workshops for training boys in plowing, ditching, stock-raising, carpentering, blacksmithing, etc.; as mere schools to supply the place of apprenticeship. Hence it has come to pass that every man has his own ideal of an Agricultural College, and criticises all these institutions when not managed in accordance with his own plans, not asking himself the question whether some one else may not be as wise as himself. We have been criticised here by some of these men, but in answer to them would say to the Legislature that we—the faculty—are always ready to do anything required by the State. Nor have we ever refused to obey, as far as was possible, the directions of the Board of Trustees.

Remark.—I wish to remark further that we have endeavored to teach as much of the above enormous course of study as our facilities and teaching force have rendered it possible.

TECHNICAL STUDIES OF RATIONAL AGRICULTURE.

I suppose the following to be a good course of technical studies in Scientific Agriculture.

Rational Agriculture should teach:

I. The nature, quantity and sources of plant food.

II. The methods which have been established by scientific experience for changing this food into plants.

III. The best uses of these plants, that is to say, how the plants can be used to produce the greatest amount of human happiness.

Hence there are three distinct classes of subjects in a complete course of Scientific Agriculture.

I. The first class treats of the nature, quantity, and sources of plant-food.

The science concerned in this are

1. Chemistry.
2. Mineralogy.
3. Geology.

These studies are distributed into three classes:

1. Junior Class.—The study of this class is General Chemistry (Inorganic).
2. Intermediate Class.—General Chemistry (Organic), Mineralogy and Agricultural Chemistry.
3. Senior Class.—Analytical Chemistry, Agricultural Chemistry and Geology.

II. The second class of studies treat,

1. Of the methods of changing plant-food into plants.

Here belong,

1. The methods of rendering potential plant-food actual, or of preparing the food for the plant (such methods are rest, fallow, rotation, green crops, mechanical improvements, &c.)
2. Drainage.
3. Botany.
4. Entomology.
5. Meteorology.
6. Forestry.

These studies are divided into three classes:

1. Junior Class.—Soils, and methods for rendering potential plant-food actual, Botany.
2. Intermediate Class.—Same subject continued, grass, and fruit culture.
3. Senior Class.—Drainage, Meteorology, Entomology, Forestry.

III. The third class treats of the use of plants and considers the best methods for such uses.

Here belongs.

1. Harvesting and preservation of crops.
2. Stock-breeding (including physology and zoology.)
3. Farm engineering (including drawing and construction of farm buildings.)
4. Landscape gardening.
5. Political economy.

These studies are divided in three classes.

1. Junior Class.—Methods of harvesting and preserving crops, Farm Engineering, Physiology.
2. Intermediate Class.—Drawing, Zoology, Stockbreeding.
3. Senior Class.—Drawing, Stockbreeding, Landscape Gardening, Political Economy.

Preparation needed for entering these courses of study,—Algebra, and Geometry, and such studies as prepare for Alegebra and Geometry.

STATEMENT OF WORK DONE BY EACH TEACHER OF THE SCHOOL.

1. B. L. Arnold.

During the past two years I have taught Chemistry, Physics, Mechanics' Logic, Mental Science, Ethics, Physiology.

Remark.—It is plain that we need more division of labor; it is impossible for one man to teach so many things with success, without overtaxing his body and mind. It is greatly hoped that we should soon receive relief from the Legislature. Time for study should be allowed to every teacher and the teacher be required to study during that time. It is not possible, that persons unacquainted with educational matters, should know how needful it is that the teacher be a diligent student, hence he should have first, the time, secondly, the means for thorough study and investigation; it is better for teacher, pupil, parent and state.

The teachers in the Agriculture College are all so crowded with the work of teaching as to have but little time for study. We hope the Legislature will take this into consideration and give us funds enough to enlarge our faculty.

B. L. ARNOLD.

SCHOOL OF MATHEMATICS.

Joseph Emery, Teacher; President, B. L. Arnold.

Sir: I have the honor to present the following biennial report of this department:

The course is divided into four classes:

Freshman.—Algebra and Geometry. Text Books, Davies.

Sophomore.—Trigonometry, Surveying and Engineering. Text Books, Davies.

Junior.—General Geometry and Differential and Integral Calculus. Text Books, Olney.

Senior.—Application of Calcus in tracing Curves, and Astronomy. Text Books, Olney and Olmstead.

I have also taught Zoology, Geology and Mineralogy, and heard a daily recitation in Advanced Grammar. Text Books, Dana & Whitney and Orten.

Students are taught the practical use of the Level, Solar Compass and Transit.

Cabinet.—We have a splendid collection of Geological and Mineralogical specimens for class-room work, and each year we are collecting new specimens from every part of the State. This work is largely done by cur students.

Very respectfully,
JOSEPH EMERY.

Dec. 19, 1884.

REPORT.

To THE PRESIDENT :

I herewith submit the following report of the Department of Ag- iculture and Chemistry from September, 1883, to December, 1884 :

Owing to the fact that the Chair of Agriculture was not filled till ny election to the Professorship of Agriculture and Chemistry in September, 1883, and that previous to this Agricultural studies were istributed among the different members of the Faculty, no well defined course could be carried out in every particular. Since my election I have endeavored to make this course as thorough as our facilities would permit.

AGRICULTURAL CHEMISTRY.

I have given instruction during the year to the junior class in Agricultural Chemistry, comprising such topics as Origin and Formation of Soils, Relation of Chemistry to Agriculture, Physical and Chemical Properties of the Soil, Chemical Composition of Plants, including a careful study of the source and relative abundance of the elements of plant growth; Means of Maintaining and increasing the Fertility of Land, Theory of Exhaustion, pointing out during the progress of the class such means of improving the land as would be practical and profitable even in a new country; impressing upon their minds that plant growing and stock rearing are based upon chemical and physiological laws which cannot be ignored if the best results are to be obtained.

I have reviewed with the class the Experiments of Laws and Gilbert of Rothanstead, England, and the conclusions drawn therefrom.

I gave the class a short course of lectures on Manures, comprising barnyard manure, its composition and means of retaining its fertilizing properties, composting, lime, Gypsum, guano, potash, salts, etc.; chemical effect of drainage upon land, green manuring, rotation of crops.

The class during the session have written Agricultural essays, and have shown much interest and enthusiasm in this work. They have also experimented on the farm during the year.

PRACTICAL AGRICULTURE.

I have delivered a course of lectures during the year to a class of thirty-five on Stock and Stock Breeding, in which are discussed the various breeds of cattle, horses, sheep, swine and poultry, their history, peculiarities, adaptation, etc. Special attention is given to the value of stock in a system of rotation of crops and mixed husbandry. This course of lectures is continued, from the freshman year to the junior, as the student is prepared by the study of other branches of science which are closely related to Agriculture.

FRUIT CULTURE.

A class in Fruit Culture will be organized during the year. "Downings Selected Fruits" will be used as a Text Book, supplemented by lectures. Production of new varieties, propagation, grafting, budding, laying, etc., pruning, transplanting, soil and aspect, insects, diseases, gathering and storing, etc., etc., are some of the topics which will be discussed.

BOTANY.

Since the resignation of Prof. Hawthorne to accept a position in the State University, I have had charge of a class in Botany. I have used Gray's Botany as a text book. The student is encouraged to study the plant as much as possible, rather than the book. As this study is preeminently fitted to train the student to observe, compare and classify, I consider it of first importance in Agriculture in giving a knowledge of the plant, its growth, manner of living and structure.

POLITICAL ECONOMY.

I have taught the senior class in Political Economy during the year, using "Chapin's Wailand's Political Economy" as a Text Book. The following are some of the topics which are fully discussed: Definition and division of the science, production, labor, capital, exchange with its money, credits and banking, division of labor, monopolies, protective laws, distribution, supply and demand, ways and profits, interest, rents, consumption, prudential, luxurious, communism.

CHEMISTRY.

In the Department of Chemistry I have taught a class of 26 in Inorganic Chemistry. I have used Roscoe's Elements of Chemistry as a Text Book. The student is made familiar with the history of

Chemistry, laws of Chemical combination, Chemical affinity, gasses, liquids and solids, elementary substances, history, distribution, combinations, application of Chemistry in the arts and industries. The lessons are illustrated with appropriate experiments. In Analytical Chemistry the class will spend one hour a day during the last term with the blow-pipe. They will also be made familiar with the methods of qualitative analysis. Three things are much needed to do proper work in this Department, namely: time, room and apparatus.

WORK ON THE FARM.

Two acres of ground has been set apart on the farm for experimental purposes, an amount entirely inadequate, if experiments of any great value are to be carried on. It is to be hoped that by another year the whole farm will be used in connection with the College for experimental purposes and for giving practical instruction in Agriculture. The school room and the farm must be brought nearer together if theory and practice are to go hand in hand. I have found students anxious to work on the experimental plots, and many students would be glad to work on the farm if by that means they could partially pay their tuition.

Last spring the students of the Agricultural class furnished seeds of various kinds of wheat, oats, barley and potatoes from their various counties and planted them on the experimental grounds. They also experimented with Texas millet, Italian rye grass, Lincoln grass (Arrenatherum arenaceum), Johnson grass (Sorgum halepensis.) This was not intended to rank as experimental work, but as preparatory to more extensive work in the future.

In October the students, under my direction, planted 58 plots of grasses and clovers in plots 35x12 feet. They comprise the following kinds :

Agrostis stolomfera, creeping bent grass.
Agrostis vulgaris, red top grass.
Anthroxanthum odoratum, sweet vernal grass.
Alopecurus pratensis, meadow fox tail.
Avena elatior, tall meadow oat grass.
Avena flaverscens, yellow oat grass.
Brownus pratensis, meadow brome grass.
Brownus mollis, soft chess.
Brownus schraderi, rescue grass.
Cynosurus cristatus, crested dogs tail.
Dactylis glomerata, orchard grass.

Festuca duriuscula, hard fescue.
Festuca elatior, fall fescue.
Festuca heterophylla, various-leaved fescue.
Festuca ovina, sheep fescue.
Festuca pratensis, meadow fescue.
Holcus lanatus, meadow soft grass.
Lolium Italicum, Italian rye grass.
Lolium perenne, English rye grass.
Onobrychis latora, or lanfrin.
Phleum pretense, timothy.
Poa aquatica, water meadow grass.
Poa nemoralis, wood meadow grass.
Poa pratensis, blue grass.
Poa trivalis, rough stalked meadow grass.
Johnson grass, sorgum halepensis.
Lincoln grass, arrenatherum avenaceum.
Alfalfa, lucerne.
Alsike, trifolium hybridum.
Bokhra clover, melilotus alba.
Trifolium pratense.
Perennial clover or English cow grass.
Yellow trefoil, medicayo lupulina.

I expect to add many more to this list in the spring. It seems to me that the cultivation of the grass and forage plants in general should demand our special attention. Permanent pastures are too scarce, and grasses of restricted range, belonging to dry, wet or shady pastures, and others almost cosmopolitan are indiscriminately sown. Many impositions are practiced upon farmers by seed men, who sell the common grasses, and often worthless sorts, by giving them a new name, which is the only recommendation they have.

I expect in the spring to experiment with several varieties of wheat and oats, and as the farm is small and experiments must be carried on in small plots, I expect as rapidly as I can raise seed to distribute them among such farmers as will experiment with them and report results to me. By such means we can have many experiments of the same nature in different parts of the State asking and receiving answers from different soils and conditions.

After a careful study of some of the most successful Agricultural Schools I am convinced that much of their success is due to their co-operation with the farmers, through farmers institutes, societies and co-operative field experiments.

I expect in the near future to ask the assistance of those interested n Agriculture in organizing such institutes in various parts of the State. We need the united efforts of the farmers and faculty if the bject of the Agricultural College is to be fully carried out.

E. GRIMM,
Professor of Agriculture and Chemistry.

MISCELLANEOUS.

EXPERIMENTS IN AGRICULTURE.

Prof. Grim is doing all he can in this direction. He is a young nan, but intelligent, industrious and persevering. I may remark, hat people have in general no notion of the cost of experimenting n Agriculture. I make the following quotation from the "Inaugural Lecture of Dr. Gilbert upon his induction into the Chair of Rural Economy in the University of Oxford, England. He has been cting as Chemist for Dr. Lawes in his experiments at Rothamstead. Ie says: "I have already quoted the opinion of Sir Humphrey Davy, that scientifically conducted field experiments should be undertaken by proprietors of land who, by their education, are fitted to orm enlightened plans, and by their fortunes are able to carry them nto execution; and when I tell you that the Rothamstead field experiments, independently of all the labaratory investigations connected with them, cost considerably more, and those which have been undertaken by the Duke of Bedford at Woburn for the last seven years, n behalf of the Royal Agricultural Society of England, and which re under the direction of Dr. Voelcker, not much less than 1,000 ounds ($5,000.00) annually, you will not be surprised that such ield experiments are not more general." "At the present time the Rothamstead staff consists of two, and sometimes three, chemists; everal general assistants in different departments; occasionally a botanical assistant; three, and sometimes four, computors and record-keepers; also a labaratory man and several boys."

wish to remark in passing that—

(1) These experiments of Mr. Lawes are carried on at private expense, hence we may expect economy;

(2) There is no teaching to be done by the experimental corps;

(3) That Mr. Lawes uses only small plats of land;

(4) That his whole expense for field experiments is from $15,000 o $20,000 a year;

(5) That there is a bill before Congress which gives to each Agricultural College for experiments $1,500.00 a year;

(6). The following letter, addressed by Agricultural Colleges to

Representatives and Senators, shows some of the reasons why this bill should pass;

(7). The Agricultural College of Oregon is weak in funds, and especially needs this appropriation;

(8). It seems to me the duty of our Legislature to memorialize Congress for this purpose, viz: that the aforesaid bill should pass:

To the Hon. ....

The Congressional bill H. R., No. 7498, "To establish agricultural experiment stations, has been favorably reported by the Committee on Agriculture, and its passage recommended. It is now before Congress, and ready to be acted upon; and you are earnestly requested to give it that consideration which its importance entitles it to receive.

This bill proposes to provide such stimulus for agricultural improvement as the patent laws do for mechanics, manufacturers and artists, and the copy-right laws for authors. This seems to be the only way in which such an end can be reached. Farmers cannot maintain a personal right to improvements in tillage, in crops, in stock-breeding, in overcoming the diseases of animals or plants, or in withstanding the attacks of insect enemies. However much of labor or study or money the farmer may expend for either of these, his neighbor can imitate his work and get as much profit from it as he himself can, and that without asking permission or expressing thanks. Some action of the sort proposed by this bill may fairly be asked, in order to put agriculture on a par with the other industrial arts.

Agricultural Experiment Stations carry on investigations in subjects of the greatest importance to agriculture, by the use of the accurate methods and processes of Chemistry, Botany, Entomology, Physiology, and kindred sciences. The analysis and management of manures, the production and adaptation of new varieties of seeds and crops, the destruction of injurious insects, the protection against contagious diseases of animals, have all been the subject of successful and satisfactory investigation in Experiment Stations. Wherever they have been established they have proved themselves of great benefit to farmers, and have received their unanimous and hearty support. There are a hundred or more of them in the various countries of Europe, and in our country they have been established in Connecticut, North Carolina and New Jersey for several years, and are highly valued. More recently they have been established in New York, Ohio, Wisconsin, and some other States, and are doing good work.

When the interests involved are looked at, it will be seen that the outlay contemplated by this bill is exceedingly small— fifteen thousand dollars ($15,000) a year for each State, or five hundred and seventy thousand dollars (($570,000) for all the States, while seven million five hundred thousand (7,500,000) men, which is forty-four (44) per cent. of our working population, are engaged in agriculture; ten thousand million dollars ($10,000,000,000) are invested in farm lands, four hundred million dollars ($400,000,000) in its implements and machinery, fifteen hundred million dollars ($1,500,000,000) in its live stock, and its annual products are twenty-two hundred million dollars ($2,200,000,000). Surely the farming community may ask this comparatively small provision for their interests.

The bulletins publishing the result of the work of the State Experiment Stations are printed as soon as the work is done, and sent without charge to farmers who desire them. And they are producing a great revolution in farm economy wherever their influence extends. The benefits of intelligence and skill in farming make themselves felt wherever they are applied. To produce these, no other means equal to that of Agricultural Experiment Stations have been devised. And no thrifty and progressive farming community can afford to do without them.

The establishment of these stations in connection with the Agricultural Colleges will be strengthening to both. The Colleges have done excellent work and have given a large return to the country for the gifts by which they were established. The $7,000,000 fund created by the gifts of the Government has been supplemented by $5,000,000 more from States and benevolent individuals. The Colleges have been established in all the States, and more than 4,000 students are profiting from the instructions of above 400 professors. These institutions mainly teach the branches of learning which relate to agriculture and the mechanic arts,—while the Experiment Stations apply these branches of learning to the practical wants of the agriculturist. The studies begun by the students in college are carried on by the practical farmer in the field, and the college professors will be quickened in their duties by seeing the useful purposes to which their sciences are applied. It brings learning and work fairly in connection, and meets a pressing demand of the age.

The advantages to be secured by the passage of this bill are wide and far-reaching, both for the farmers and for the whole country; and the interests which it is intended to promote are so vital to the prosperity of the whole country as to be entitled to the fostering care of the General Government. Trusting that these suggestions will commend themselves to your favorable consideration, we ask for the bill your earnest support.

Yours very respectfully,

. . . .

MECHANICAL DEPARTMENT.

The following resolution was passed by the Board of Trustees at its last annual meeting :

"We recommend that the Board authorize the Executive Committee and the President of the Faculty to take such action as they may deem best to organize a Mechanical Department, and secure aid fo the same from the State."

But little can be done toward this Department without a large amount of money; but it is the intention of the Board to open this Department as soon as funds are available.

COURSE OF STUDY.

It seems advisable to allow the Board of Trustees of the College t modify the course of study, so far as relates to the ancient languages at least.

MILITARY DRILL.

We need some sixty or seventy guns. The guns which we ha were removed by Gov. Chadwick during the recent Indian war i Eastern Oregon, and have never been returned.

THANKS.

1. Thanks are due to our Senators and Representative in Congress for many valuable public documents.

2. To our State Officials for uniform courtesy and prompt attentio to the business of the College with which they have been concerned

BUILDING.

We are making efforts, with good prospects of success, to secure new College building.

GRADUATES.

870	J. K. P. Currin, B. S.	Cottage Grove
	Rob't McVeatch, B. S	Cottage Grove
871	George F. Burkhart, B. S	Lebanon
	H. McN. Finley, A. B	Corvallis
	James D. Fountain, B. S.	Jacksonville
	W. R. Privett, B. S.	Corvallis
872	T. C. Alexander, B. S	Benton county
	John Eglin, B. S.	Benton county
	Alonzo J. Locke, B. S.	Corvallis
	James K. P. Weatherford, B. S.	Albany
873	L. N. Liggett, B. S.	Albany
	W. F. Herrin, B. S.	Jacksonville
	O. L. Ison, B. S.	Baker City
1874	J. R. Bryson, B. S.	Brownsville
	T. H. Crawford, B. S.	Norton's
	Emmet H. Taylor, B. S.	Corvallis
	G. A. Grimes	Harrisburg
	W. C. Crawford	Norton's
1875	R. A. Fuller, B. S.	Corvallis
	P. E. Linn, B. S.	Eagle Creek
1876	F. Cauthorn A. M.	Corvallis
	Isaac Jacobs, B. S,	Corvallis
	George P. Lent, B. S.	East Portland
	N. A. Thompson, B. S.	Corvallis
1878	S. T. Jeffreys, A. B.	Independence
	F. W. Vincent, B. S.	Corvallis
	E. J. Glass, B. S.	Corvallis
	M. S. Neugass, B. S.	Corvallis
1879	Ernest White, A. M.	Albany
	B. F. Loden, B. S.	Hubbard
	Marion Elliott, B. S.	Corvallis
	Dayton Elliott, B. S.	Corvallis
1880	W. E. Yates, A. M.	Corvallis
	S. G. McCoun, A. B.	Corvallis
	Edgar Grim, B. S.	Hubbard

1881	E. E. Charman, A. B.	Oregon City
	T. L. Charman, B. S.	Oregon City
1882	W. Y. Masters, A. M.	Portland
1883	W. G. Emery, A. B.	Linn county
	W. H. Holman, B. S.	Benton county
	G. B. Hovenden, B. S.	Marion county
1884	D. H. Glass, A. B.	Crawfordsville
	W. E. Newton, A. B.	Benton county

STUDENTS FOR THE YEAR 1882-'83.

Abbey, Edwin J.
Abbey, Richard.
Bowers. Ira E.
Brassfield, Arthur.
Brock, Russell W.
Buchanan, Andrew S.
Buchanan, Robert G.
Bush, Howard L.
Clemens, John A.
Collins, Benjamin F.
Collins, James H.
Crocker, Charles L.
Davis, Zenas C.
Denman, John.
Douglas, John.
Dunsworth, John A.
Elliot, Elda J.
Emery, William G.
Ferguson, Claud C.
Glass, David H.
Guilliams, Rufus.
Haasler, J. C.
Hodges, Arthur.
Holgate, Harvey L.
Holeman, William H.
Hovenden, George B.
Humphreys, John H.
Jackson, Edgar.
Jackson, Edwin.
Jacobs, Isadore.
Jennings, Orville O.
Johnson, Jasper J.
Johnson, William W
Keesee, Andrew T.
King, W. R.
LaDow, George I.
Lilly, George E.
Lilly, Leslie.
Locke, W. T.
Logan, W. C.
Mattoon, Frank S.
Mattoon, Leslie.
McNulty, Claude B.
Newton, W. E.
Owsley, B. F.
Peck, Frank J.
Rayburn, Fred W.
Robbins, O. W.
Ryals, W. F.
Scott, Charles.
Skeels, Chester W.
Skeels, George.
Stock, Sol. S.
Thompson, Charles D.
Wadsworth, William S.
Whitney, J. E.
Will, George C.
Yates, Fred.

STUDENTS FOR THE YEAR 1883-'84.

Abbey, Edwin J.
Abbey, Richard.
Allen, Alonzo W.
Bowers, Ira J.
Brassfield, Arthur.
Buchanan, Robert G.
Bush, Howard L.
Collins, B. T.
Collins, J. H.
Cook, Edwin.
Denman, John.
Ferguson, Claude C.
Glass, David H.
Guilliams, Rufus.
Heisler, William.
Holgate, Henry L.
Hill, A. L.
Hoffman, G. F.
Hall, Oren.
Hall, William.
Jacobs, Isadore.
Johnston, —
King, William R.
Lilly, Leslie.
Lilly, George E.
Lewis, James.
Mack, William A.
Mattoon, Frank S.
Martin, Barney S.
Newton, E.
Newton, W. H.
Owsley, B. F.
Rayburn, Fred W.
Robbins, O. W.
Ryals, W. F.
Rickard, J.
Reeves, George.
Scott, Charles.
Skeels, Chester W.
Stayton, George.
Starr, Oscar.
Sturgill, J. J.
Thompson, Charles D.
Thompson, George.
Vaughan, H. L.
Vaughan, L. J.
Wadsworth, William S.
Whitney, J. E.
Will, E. N.
Ward, Charles A.
Yates, Fred J.

FINANCIAL STATEMENT

From June 2, 1882, to June 2, 1884.

Report of the Treasurer for the years 1882–4, commencing with June 2, 1882, and ending June 2, 1884.

AGRICULTURAL COLLEGE FUND FOR 1882-3.

RECEIPTS.

DATE.		FROM WHAT SOURCE.	AMOUNT.
1882			
May	29	Balance as per last report	$ 30 95
July	22	Cash from B. L. Arnold	800 00
Sept.	6	Cash from B. L. Arnold	700 00
Dec.	2	Cash from B. L. Arnold	1,831 54
1883			
March	5	Cash from B. L. Arnold	1,800 00
June	2	Cash from B. L. Arnold	2,033 33
		Total	$ 7,195 82

DISBURSEMENTS.

DATE.		FOR WHAT PURPOSE.	AMOUNT.
1882			
June	30	Paid on warrant No. 1, 1885, B. L. Arnold	$ 25 00
July	22	Paid balance on warrant 27, 1882, J. Emery	373 33
	22	Paid balance interest on same	5 61
	22	Paid balance warrant 26, 1882, B. J. Hawthorne	373 33
	22	Paid interest on same	5 61
	22	Paid on warrant 1, 1878, B. L. Arnold	40 00
Sept.	6	Paid express charge from Salem	1 40
	6	Paid warrant 25, 1882, B. L. Arnold	600 00
	6	Paid interest on same	16 66
	6	Paid on warrant 1, 1878, B. L. Arnold	80 00
Dec.	2	Paid express charges from Salem	1 80
	2	Paid warrant 6, 1882, B. J. Hawthorne	513 33

DISBURSEMENTS—CONTINUED.

DATE.		FOR WHAT PURPOSE.	AMOUNT.
1882			
Dec.	4	Paid warrant 7, 1882, Jos. Emery.	$ 513 33
	9	Paid warrant 5, 1882, B. L. Arnold	660 00
1883			
March	5	Paid warrant 12, 1883, B. J. Hawthorne	513 33
	5	Paid express charges	3 60
	5	Paid warrant 11, 1883, B. L. Arnold	660 00
	6	Paid warrant 13, 1883, Jos. Emery	513 33
	10	Paid warrant 16, 1883, Allen & Woodward	15 75
	10	Paid balance on warrant 1, 1878, B. L. Arnold	77 75
April	28	Paid warrant 17, 1883, Queen & Co., Philadelphia	10 67
June	2	Paid warrant 21, 1883, Jos. Emery	513 34
	2	Paid warrant 20, 1883, B. J. Hawthorne	513 34
	2	Paid warrant 19, 1883, B. L. Arnold	660 00
	2	Paid warrant 22, 1883, B. Wolverton	385 00
	2	Balance	120 31
			$ 7,195 82
	2	Balance on hand	120 31

Year 1883–4 from June 2 to June 2.

AGRICULTURAL COLLEGE FUND.

RECEIPTS.

DATE.		FROM WHAT SOURCE.	AMOUNT.
1883			
June	7	Balance on hand as in last report	$ 120 31
Aug.	8	Cash from B. L. Arnold	1,500 00
Nov.	24	Cash from B. L. Arnold	2,033 33
1884			
Feb.	28	Cash from B. L. Arnold	1,833 30
May	31	Cash from B. L. Arnold	2,433 34
		Total	$ 7,920 00

DISBURSEMENTS.

DATE.		FOR WHAT PURPOSE.	AMOUNT.
1883			
Dec.	1	Paid warrant 22, 1883, B. L. Arnold	$ 600 00
	1	Paid warrant 23, 1883, B. J. Hawthorne	466 67
	1	Paid warrant 24, 1883, Jos. Emery	466 67
	1	Paid warrant 27, 1883, E. Grim	333 34
	21	Paid warrant 33, 1883, W. G. Emery	12 00
1884			
Jan.	21	Paid warrant 30, 1884, W. G. Emery	12 00
	21	Paid warrant 37, 1884, J. Senders	4 90
	21	Paid warrant 39, 1884, S. N. Wilkins	7 50
Feb.	28	Paid express charges	3 50
March	1	Paid warrant 44, 1884, Jos. Emery	466 67
	1	Paid warrant 43, 1884, B. J. Hawthorne	466 67
	3	Paid warrant 47, 1884, E. Grim	333 33
	4	Paid warrant 42, 1884, B. L. Arnold	600 00
May	17	Paid warrant 40, 1884, Woodcock & Baldwin	13 00
	31	Paid express charges	2 34
	31	Paid warrant 51, 1884, B. L. Arnold	600 00
	31	Paid warrant 52, 1884, B. J. Hawthorne	466 67
	31	Paid warrant 53, 1884, Joseph Emery	466 67
	31	Paid warrant 54, 1884, W. W. Bristow	350 00
	31	Paid warrant 56, 1884, E. Grim	333 33
		Total	$ 6,005 26

RECAPITULATION.

Receipts for year 1882–3	$7,195 82
Disbursements	7,075 51
Balance	$ 120 31
Receipts for year 1883–4	$7,920 28
Disbursements	6,005 26
Balance	$1,015 02

UNIVERSITY OF ILLINOIS

FOURTEENTH BIENNIAL REPORT

OF THE

OREGON

STATE AGRICULTURAL COLLEGE

TO THE

Legislative Assembly.

FOURTEENTH REGULAR SESSION--1887.

1859

SALEM, OREGON:
W. H. BYARS, STATE PRINTER.
1886.

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1859

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W. H. BYARS, STATE PRINTER.
1886.

BIENNIAL REPORT.

Corvallis, Oregon, Dec. 20, 1886.

To His Excellency, Gov. Z. F. Moody:

Sir—I have the honor respectfully to submit the Fourteenth Biennial Report of the Oregon State Agricultural College.

Very Respectfully,
B. L. ARNOLD,
President.

REPORT.

To His Excellency Gov. Z. F. Moody:

SIR—I deem it desirable to bring before the Legislative Assembly the various laws of the United States, and of Oregon, that relate to the establishment and organization of the Agricultural College. And I wish, especially, to call attention to one or two points in the law of Congress. Section 5, Article 4, requires that the State accepting the grant shall cause a printed report of its Agricultural College to be transmitted to each and every Agricultural College in the United States. This has not been done in case of Oregon, although I have frequently called attention to the law. The officers of our State say that they are not authorized to issue [more] than three hundred perhaps. I think, however, that the State in accepting the grant of Congress virtually enacted a law authorizing our officers to issue as many reports as may be needful to fulfill the law. Other Colleges have well-nigh ceased to send us their reports, and they have frequently called our attention to the Congressional law. And, besides this, some of the Agricultural Colleges outside of the United States send us their reports, from which we frequently gain valuable information. We ought, I think, to return our report.

TACTICS.

The law of Congress requires us to teach tactics. To do this requires a man trained in a military school, and, as we are in need of an additional Professor, I suggest that the Legislature provide for this. An addition of some twelve hundred dollars to our present appropriation would enable us to employ a military man who could teach some other branches of knowledge and at the same time teach tactics.

EXPERIMENT STATIONS.

I call attention to the subject of experiment stations in the report. This is a most important matter and demands the most serious attention of the Legislature. Experience proves that experiments to be valuable must be made with attention to many exact conditions, and these require large expense; the Faculty of Tuition cannot economically devote their time to experimenting, either the teaching or the experimenting will be slighted. Hence many of the States have established at their Agricultural Colleges what are called experiment stations after the fashion of Germany, and there is a bill in Congress, called the Hatch bill, whose object is to endow these stations. Allow me most respectfully to ask the Legislature to memorialize Congress on this bill.

COLLEGE RULES.

The rule 4, relating to intoxicating liquors and games, I regard as unjust; it punishes the student and lets the saloon-keeper go free; in other words it furnishes a youth for entering a trap which a vile man has set for him, and it permits the trapper to go unpunished. This is unjust.

TECHNICAL EDUCATION.

I wish to call attention to the advancement of technical education. There has been much done recently to promote technical education in Europe and elsewhere, and, if we are to keep pace with civilization, we must look well to this matter. Our young people must prepare themselves for strong competition from abroad. Lower civilization must give place to higher. This is true of States, as well of individuals—the weaker must yield to the stronger in the progress of society. Mr. J. S. Russell, an English writer of force, says: "When education has given to each man a knowledge of all the branches of his work, and there remains no difference of rank, excepting superior skill and intelligence, then each man's individual work will be weighed in the balance, and the true share of his merit will be appraised in the scale of wages. Equality will be then, as now, impossible, but the scale of each man's life may be one of steady, continual, meritorious rise." Again, he says, "The farmer (in addition to a fundamental education) should be educated in sciences, elementary engineering, mechanics and agriculture. * * The machinist must master all the known powers of material nature. Architects, engineers, teachers and all classes of workers require technical education." Again, Mr. Stetson, in his work on technical edncation, says: "The person who has general charge of any business should understand the business both theoretically and practically. His knowledge of principles should be such as to enable him to instruct any subordinate requiring instruction, to determine at once the comparative value of different processes of work, or to invent new ones when emergencies require it. In a word, he should be able to reach just conclusions at once by a knowledge of principles, and not slowly by trial and error. He should be workman enough to know when work is well done, that he may not be cheated by those under him, and that he may be able to render justice to all by daily discriminating between the skilled and unskilled laborer. He should understand his business, as a whole, and the relation of each part to the whole. Neither skilled workmen nor tariffs can compensate for stupidity on the part of the superintendent. Only the very few exceptional geniuses, like Stephenson, become thus qualified to take charge of enterprises, great or small, without special school instruction."

2. "The workman should not only be dexterous in manipulation; he should certainly know so much of the theory of his business as will enable him readily to comprehend all instructions, verbal or graphic, given for his guidance. The more extended and thorough his knowledge of principles the better. Such a workman requires very little supervision; he executes with rapidity; he wastes the least possible; he adapts himself readily to new methods; he devises novel and better ways for doing even the simplest things; he is the first to be promoted, he is the last to be discharged; he always commands the best wages, and yet his labor is the cheapest in the market. On the other hand, the workman who works only by 'rule of thumb,' though he may be dexterous, lacks logic, lacks invention, lacks adaptability; indeed, only is a better kind of machinery.

3. "The workman should be better instructed because of the machinery used, since it is the rude or dexterous workman, rather than the really skilled workman, who is supplanted by machinery. Skilled labor requires thinking, but a machine never thinks, never judges, never discriminates. Objects which have a simple and regular form, and require high finish or not, may be made with advantage by machinery, if the objects are produced in large numbers. Most kinds of work which demand little besides strength for their execution can usually be best done by machinery, too. Though the employment of machinery does, indeed, enable rude laborers to do many things now which formerly could be done only by dexterous workmen, yet, after making allowance for all the bearings of the question, it is clear that the use of machinery has decidedly increased the relative demand for skilled labor, as compared with unskilled labor, and there is abundant room for an additional increase if it is true, as declared by the most eminent authority, that the power now expended can be readily made to yield three or

four times its present results, ultimately ten or twenty times when masters and workmen can be had with sufficient intelligence and skill for the direction and manipulation of the tools and machinery that would be invented.

4. "All those persons whose business it is to produce new combinations of matter—such as the farmer, miner, dyer, bleacher, founder, maker of machinery, and numerous others—should have a knowledge of chemistry. Without such knowledge, which is an essential element of skilled labor in these departments of industry, neither rude nor dexterous labor can produce satisfactory results.

5. "The utmost effort should be made to produce articles of beautiful design, whether in form or color, or both. The difference between good design and poor design is the difference between success and failure in the market of the world. When the beauty of the object depends, as it usually does, upon on its own form, or upon the form of the applied decoration, the workman should be one who has been thoroughly instructed in artistic drawing and designing. Not only should the originator of the design have been thus instructed, but also the reproducer of the design in wood, metal, earth, or other substance.

6. "For the most successful prosecution of any great enterprise in land or naval architecture, in the construction of railroads, canals, machinery, there should not only be an abundance of thorough and expert draughtsmen, but each workman should be draughtsman enough to make a drawing of any object he is required to construct. Of two competing establishments, the one having such workmen, the other not, the former would not only win, but would distance the latter every time." I have quoted thus at length because these high anthorities show in these strong words both the object and value of technical education at the same time, and they *well* show both. We are doing all we can to organize the mechanical department at the Agricultural College; but little can be done till the Legislature shall supply shops for the application of mechanical principles; we need models, and models can be furnished at moderate cost.

MANUAL LABOR.

How much manual labor should be required of students is still an unsettled question. There is little or no time in the winter fit for labor out of doors. When the Legislature provides shops for mechanical work, the study of mechanical processes and structures will require all the manual labor needful for their thorough comrehension, and that will be considerable. I believe that manual abor should be a matter rather of encouragement than of force.

VETERINARY MEDICINE.

I believe that the Legislature should establish at the Agricultural ollege a chair of Veterinary Medicine at once. When we reflect hat the loss of even a thousand cattle by disease would be the loss f from $20,000 to $25,000, a small sum might, we think, be risked n the attempt to give the farming community all the aid from nowledge that the world of science can produce. A large part of he wealth of our state consists in live stock, and our youth who ttend the Agricultural College should have the benefit of all the nown principles of veterinary surgery and therapeutics.

Thanking you and our State officers for the courteous treatment eceived at their hands, in the name of the Board of Trustees and aculty of the College, I subscribe myself most respectfully, yours ruly,

B. L. ARNOLD.

AN ACT

o Accept the Proposition of the Congress of the United States Granting Lands to the State of Oregon for Agricultural Colleges.

WHEREAS, The Congress of the United States did pass an act, in ffect following, to-wit: An act donating public lands to the several States and Territories which may provide colleges for the benet of agriculture and the mechanic arts:

SECTION 1. *Be it enacted by the Senate and House of Representatives f the United States of America in Congress assembled,* That there be ranted to the several States, for the purposes hereinafter mentioned, n amount of public land, to be apportioned to each State, in quantity equal to 30,000 acres for each Senator and Representative in ongress, to which the States are respectively entitled by the apportionment under the census of 1860; *Provided,* That no mineral ands shall be selected or purchased under the provisions of this act.

SEC. 2. *And be it further enacted,* That the land aforesaid, after being surveyed, shall be apportioned to several States in sections, or sub-divisions of sections not less than one-quarter of a section, and whenever there are public lands in a State subject to sale at private entry, at one dollar and twenty-five cents per acre, the quantity to which said State shall be entitled shall be selected from such lands within the limits of such State, and the Secretary of the Interior is hereby directed to issue to each of the States in which there is not the quantity of public lands subject to sale at private entry, at one dollar and twenty-five cents per acre, to which said State may be entitled under the provisions of this act, land scrip to the amount in acres for the deficiency of its distributive share; said scrip to be sold by said State, and the proceeds thereof applied to the uses and purposes described in this act, and for no other use or purpose whatsoever; *Provided,* That in no case shall any State to which land scrip may thus be issued be allowed to locate the same within the limits of any other State, or of any Territory of the United States; but their assignees may thus locate said land scrip upon any of the unappropriated lands of the United States subject to sale at private entry, at one dollar and twenty-five cents per acre; and, *Provided further,* That not more than one million acres shall be located by such assignees in any one of the States; and, *Provided further,* That no such locations shall be made before one year from the passage of this act.

SEC. 3. *And be it further enacted,* That all expenses of management and superintendence and taxes from date of selections of said lands previous to their sale, and all expenses incurred in the management and disbursement of the moneys which may be received therefrom, shall be paid by the States to which they may belong out of the treasury of said States, so that the entire proceeds of the sale of said lands shall be applied without any diminution whatever to the purposes hereinafter mentioned.

SEC. 4. *And be it further enacted,* That all moneys derived from the sale of lands aforesaid, by the States to which the lands are apportioned, and from the sale of land scrip hereinbefore provided for, shall be invested in stocks of the United States, or of the States, or some other safe stocks, yielding not less than five per centum upon the par value of said stocks; and that the money so invested shall constitute a perpetual fund, the capital of which shall remain forever undiminished (except so far as may be provided in Section 5 of this act), and the interest of which shall be inviolably appropriated by each State which may take and claim the benefit of this act to the endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislature of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.

Sec. 5. *And be it further enacted,* That the grant of land and land crip hereby authorized, shall be made on the following conditions, o which as well as to the provisions hereinbefore continued, the revious assest of the several States shall be signified by legislative cts:

1. If any portion of the fund invested, as provided by the foreoing section, or any portion of the interest thereon, shall, by any ction or contingency, be diminished or lost, it shall be replaced by he State to which it belongs, so that the capital of the fund shall emain forever undiminished; and the annual interest shall be egularly applied without diminution to the purposes mentioned in he fourth section of this act, except that sum, not exceeding 10 per entum upon the amount received by any State under the provision f this act, may be expended for the purchase of lands for sites or experimental farms, whenever authorized by the respective Legislaures of said States.

2. No portion of said fund, nor the interest thereon, shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildngs.

3. Any State which may take and claim the benefit of the provisions of this act shall provide, within five years at least, not less than one college, as described in the fourth section of this act, or the grant to such State shall cease; and said State shall be bound to pay the United States the amount received of lands previously sold, and the title to purchase under the State shall be valid.

4. An annual report shall be made regarding the progress of each college, recording any improvements and experiments made, with their cost and results, and such other matters, including State industrial and economical statistics, as may be supposed useful, one copy of which shall be transmitted by mail free by each to all the other colleges which may be endowed under the provisions of this act, and also one copy to the Secretary of the Interior.

5. Where lands shall be selected from those which have been raised to double the minimum price in consequence of railroad grants, they shall be computed to the States at the maximum price, and the number of acres proportionately diminished.

6. No State, while in a condition of rebellion or insurrection against the government of the United States, shall be entitled to the benefit of this act.

7. No State shall be entitled to the benefit of this act unless it

shall express its acceptance thereof by its Legislature, within tw years from the date of its approval by the President.

Sec. 6. *And be it further enacted,* That land scrip issue under the provisions of this act shall not be subject to locatio until after the first day of January, 1863.

Sec. 7. *And be it further enacted,* That the land officers sha receive the same fees for locating land scrip issued under the provisions of this act as is now allowed for the location of militar bounty land warrants under existing laws; *Provided,* That maximu compensation shall not be thereby increased.

Sec. 8. *And be it further enacted,* That the Governor of th several States to which scrip shall be issued under this act shall b required to report annually to Congress all sales made of such scri until the whole shall be disposed of, the amount received for th same, and what appropriation has been made of the proceeds.

Therefore:

Section 1. *Be it enacted by the Legislative Assembly of Orego* That each and all of the propositions in said act of Congress offere to the State of Oregon are hereby irrevocably adopted, with all th conditions and obligations therein contained.

Sec. 2. Whereas, The time for acceptance of said propositio will expire before the next regular session of the Legislature of Oregon, there being no law accepting the same; and,

Whereas, It is expedient to make provision for locating sai lands as soon as possible, therefore this act shall take effect and b in force from and after its passage.

JOEL PALMER,
Speaker House Representatives,
WILSON BOWLBY,
President of the Senate.

Approved October 9, 1862.

ADDISON C. GIBBS,
Governor of Oregon:

State of Oregon,
Office of the Secretary of State,
Salem, November 24, 1886.

I, R. P. Earhart, do hereby certify that I am the Secretary o State of the State of Oregon, and custodian of the Great Seal thereo that the foregoing transcript of the an act to accept the proposition of Congress of the United States granting lands to the Stat of Oregon for Agricultural Colleges, has been by me compared wit the original copy of the said act now on file in this office, and tha is a true and correct transcript thereof, and the whole of said ginal act.

In testimony whereof, I have hereunto set my hand and affixed reto the Great Seal of the State of Oregon. Done at the Capitol Salem, Oregon, this 24th day of November, A. D. 1886.

[SEAL.] R. P. EARHART,
Secretary of State.

OFFICERS DETAILED FOR COLLEGES.

(United States Revised Statutes, 1878.)

SECTION 1225. The President may, upon the application of any ablished college or university within the United States, having pacity to educate, at the same time, not less than one hundred and ty students, detail an officer of the army to act as president, supertendent or professor thereof; but the number of officers so detailed all not exceed thirty at any time, and they shall be apportioned roughout the United States, as nearly as may be practicable, acrding to population. Officers so detailed shall be governed by neral rules prescribed from time to time by the President. The cretary of War is authorized to issue, at his discretion and under oper regulations to be prescribed by him, out of any small arms pieces of field artillery belonging to the Government, and which n be spared for that purpose, such number of the same as may pear to be required for military instruction and practice by the idents of any college or university under the provision of this ction; and the Secretary shall require a bond in each case, in uble the value of the property, for the care and safe keeping ereof, and for the return of the same when required.

ENGINEERS IN NAVY DETAILED FOR COLLEGES.

(Sup. Revised U. S. Statutes, Vol. I., Chap. 105.)

That, for the purpose of promoting a knowledge of steam-enginering and iron-ship building among the young men of the United tates, the President may, upon the application of an established ientific school or college within the United States, detail an officer om the Engineer Corps of the Navy as Professor in such school or ollege: *Provided*, That the number of officers so detailed shall not at any time exceed twenty-five, and such details shall be governed by rules to be prescribed from time to time by the President: *And provided further*, That such details may be withheld or withdrawn, whenever, in the judgment of the President, the interests of the public service shall so require.

STANBARD WEIGHTS AND MEASURES FOR AGRICULTURAL COLLEGES.

(United States Statutes, Vol. 21, Res. 26.)

That the Secretary of the Treasury be, and is hereby, directed to cause a complete set of all the weights and measures adopted as standards, to be delivered to the Governor of each State in the Union, for the use of Agricultural Colleges in the States, respectively, which have received a grant of lands from the United States and also one set of the same for the use of the Smithsonian Institutions; *Provided*, That the cost of each set shall not exceed two hundred dollars, and a sum sufficient to carry out the provisions of this resolution, is hereby appropriated out of any money in the Treasury not otherwise appropriated.

The following are the acts of the Oregon Legislative Assembly regarding the Agricultural College.

General Laws of the State of Oregon for 1868, page 40.

AN ACT

To Secure the Location of the Lands Donated by Congress to the State fo an Agricultural College, and to Establish such College.

SECTION 1. *Be it enacted by the Legislative Assembly of the State o Oregon*, That J. F. Miller, J. H. Douthit and J. C. Avery are hereb constituted a Board of Commissioners with power—

(1.) To locate all the lands to which this State is entitled by ac of Congress for the purpose of establishing an Agricultural College and as soon as such locations are made, to report the same to th Secretary of State; to take into consideration the further organization and perfecting of a plan for the permanent establishment o said College, in accordance with the requirements of the act o ongress making such donation, and report the same to the Govrnor by the first day of August, 1870.*

Sec. 2. That, until other provision can be made, the Corvallis ollege is hereby designated and adopted as the Agricultural College, n which all students sent under the provisions of this act shall be nstructed in all the arts, sciences and other studies, in accordance ith the requirements of the act of Congress making such donation.

Sec. 3. Each Senator is hereby authorized and empowered to elect one student, not less than sixteen years of age, who shall be eceived by the Faculty of said College and instructed by them in he manner provided in this act, for the space of two years, unless uch student shall be discharged for misconduct; *Provided, however,* That this act shall not be binding until the Trustees of said College hall adopt a resolution and file a certified copy thereof with the ecretary of State, assenting to, and agreeing on their part, to faithully carry out the provisions of this act.

Approved October 27, 1868.

The following is so much of the law of 1870 as will make the egislative history of the Agricultural College plain:

See Acts of 1870, page 17.

AN ACT

To permanently locate the Agricultural College of Oregon.

Section 1. *Be it enacted by the Legislative Assembly of the State of Oregon,* That Corvallis College, in Benton County, is hereby designated and permanently adopted as the Agricultural College of the State of Oregon, in which all students sent under the provisions of aw shall be instructed in accordance with the requirements of the Act of Congress, approved on the second day of July, 1862, granting public lands to the several States and Territories which might provide colleges for the benefit of Agriculture and the Mechanic Arts, and the acts amendatory thereof.

Sec. 2. The following persons, to-wit, J. C. Avery, L. F. Grover and N. H. Cranor, are hereby constituted a Board of Commissioners to propose a plan for the instruction and education of the students in said Agricultural College, and to prepare rules, regulations and by-laws for the government of the same, all of which shall be submitted to the Legislative Assembly at its next regular session for its adoption or rejection, and in the meantime the said College shall be governed by and under the provisions of the act of the Legislative Assembly approved the 27th day of October, 1868, in relation to said College.

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*This report could not be found.

SEC. 3. That the Board of Trustees of Corvallis College shall, by resolution, accept the provisions of this act, and agree to be bound by the same within thirty days after its passage, and cause a copy of said resolution to be filed with the Secretary of State, and upon their failure to do so they shall be deemed to have rejected its provisions.

Approved October 21, 1870.

ACCEPTANCE OF TRUSTEES OF CORVALLIS COLLEGE.

“A special meeting of the Board of Trustees of Corvallis College
as held in the College building in the city of Corvallis, Benton
unty, Oregon, October 29, 1870, at which the following pre-
nbles and resolutions were unanimously adopted.” [I leave out
e preambles; the following are the resolutions:]

Resolved, By the Board of Trustees of Corvallis College, that said
oard does accept the provisions of said act of the Legislative As-
mbly aforesaid, and they do agree to be bound by the same.

Resolved, That the Secretary of the Board is hereby directed forth-
ith to forward to the Secretary of the State of Oregon a copy of the
regoing preambles and resolutions. R. S. STRAHAN,
President.

Atttest:
B. R. BIDDLE, Secretary.

Filed in the office of Secretary of State November 2, 1870.

REPORT

OF THE BOARD OF COMMISSIONERS ON REGULATIONS AND COURSE OF STUDY FOR THE AGRICULTURAL COLLEGE OF OREGON.

To the Honorable, the Legislative Assembly of the State of Oregon:

We, the undersigned Commissioners, appointed by the act of the Legislative Assembly of the State of Oregon, approved October 21, 1870, entitled, An Act to permanently locate the Agricultural College of Oregon, pursuant to the requirements of said Act, beg leave to make the following report, prescribing rules, regulations and by-laws for the government of said institution.

J. C. AVERY.
L. F. GROVER.
N. H. CRANOR.

COURSE OF STUDY.

Prescribed by the State.

PREPARATORY CLASSES.

Mathematics—Arithmetic, Algebra.

English—Reading, Spelling, Geography, English Grammar, Penmanship, Composition, Elocution, History of United States.

Natural Science—Natural History, Philosophy, Physiology.

Languages—Latin Grammar, Latin Reader, Greek Grammar, Greek Reader, French Grammar and Reader, German.

Military Exercises—Tactics, Drill.

Agricultural—Practical instruction on Farm.

FRESHMAN CLASS.

Mathematics—Algebra, Geometry.

English—Rhetoric, Composition, History, Book-keeping.

Natural Science—Inorganic and Organic Chemistry, Qualitative Analysis, Structure and Physiology of Plants, Water, Atmosphere and Soil in their relations to Vegetable Production, Meteorology, Zoology, Botany, Physical Geography.

Languages—Ancient Geography, Roman Antiquities, Virgil, Cicero, Greek Antiquities, Greek Testament, Homer, French, German.

Agriculture—Theory and Practice of Agriculture, Principles of Tillage, Drainage, Landscape Gardening.

Military—Tactics, Drill.

Excursions—Botanical, Zoological.

SOPHOMORE CLASS.

Mathematical—Trigonometry (plane and spherical), Navigation, Mensuration, Surveying, Field Surveying, Drawing Maps of Farms, etc.

English—Rhetoric, Logic, Composition, Elocution, Book-keeping, Universal History.

Natural Science—Analysis of Minerals, Ores, Soils, Manures, Ashes of Plants, Mineral Waters, etc., etc.; Practice in Mineralogy, Etymology, Geology, Botany.

Languages—Roman and Greek Antiquities, Sallust, Horace, Odes and Ephodes, Greek Testament, Homer, French, German.

Agriculture—Theory and Practice of Agriculture, Horticulture, Farm Implements and Drainage, Stock Breeding.

Excursions—Geological, Botanical.

JUNIOR CLASS.

Moral Philosophy—Evidences of Natural and Revealed Religion, Moral Philosophy, Political Economy.

Mathematics—Analytical Geometry, Differential and Integral Calculus, Practical Surveying and Engineerin.g

English—Mental Philosophy, English Literature.

Natural Science—Qualitative and Quantitative Analysis, Mineralogy, Chemistry, Geology, Organic Analysis.

Languages—Livy, Horace's Satires, Epistles, etc.; Odyssey, De Corona, Latin and Greek Composition, French, German.

Agriculture—Theory and Practice of Agriculture, Training and Culture of Fruit Trees, the Vine, Small Fruits, Culture of Flowers.

Military—Tactics, Drill.

SENIOR CLASS.

Moral Philosophy—Evidences of Natural and Revealed Religion (continued).

Mathematical—Mechanics, Astronomy, Civil Engineering.

Natural Science—Chemistry (completed); Quantitative Analysis

Languages—Juvenal, Cicero, Tacitus, Alcestis, Thucydides, Demoshenes.

Agriculture—Theory and Practice of Agriculture, Laying Out of Lawns, Ornamenting Grounds, etc.

Military—Tactics, Drill.

COLLEGE RULES.

Prescribed by the State.

RULE 1. No student can enter a class with any professor until he shall have been admitted to the College and enrolled by the *President.*

RULE 2. All students must attend the opening religious services of each day.

RULE 3. All students will be required to observe "study" hours, and not be found loitering in the streets, in shops, or at places of amusement during these hours.

RULE 4. No student shall play at cards or billiards, or *at any time visit places of gambling or drinking*, or buy, keep, or use in his room or elsewhere any intoxicating liquors.

RULE 5. No one can remain a member of the Institution who is idle or vicious, or whose influence is detrimental to the discipline or reputation of the College.

RULE 6. No student will be allowed to smoke on or near the College grounds.

RULE 7. All students will be required to abstain from all profane and obscene language, and all noisy or disorderly conduct about the College buildings.

RULE 8. Students must attend promptly to their duties and studies assigned them, and in no case suspend a study or change a recitation without permission.

RULE 9. A record of the scholarship and deportment of each student will be kept, and this will at all times be open to the inspection of parents and guardians.

RULE 10. It is expected and enjoined that students, on Sunday attend the church of their choice, or that of their *parents* o guardians.

CONCEPTION OF A PRACTICAL EDUCATION, BASED ON SCIENCE.

A practical education based on science supposes three things—viz:

1. A certain amount of instruction in science;
2. A certain amount of instruction in technological studies;
3. A certain amount of instruction in the practical application of principles.

For example, when a man farms, he applies principles to practice, and Agricultural education teaches him how to apply these principles well. Now in this case scientific education enables him to understand the principles well; technical education teaches him to apply them well; and practical education applies them. Hence, if one school must teach all this, and in addition studies in a Mechanical Department, a very large corps of teachers must be had and costly outfit must be used. Such school must have at least three faculties—

1. A Scientific and Literary Faculty;
2. A Faculty for Technical Studies;
3. A Faculty for Teaching the Operations.

The law organizing the Oregon Agricultural College contemplates an institution upon the broad basis above alluded to. An attentive consideration of the following course of study will make this evident.

TECHNICAL STUDIES OF RATIONAL AGRICULTURE.

I suppose the following to be a good course of technical studies in Scientific Agriculture:

Rational Agriculture should teach—

I. The nature, quantity and sources of plant food.

II. The methods which have been established by scientific experience for changing this food into plants.

III. The best uses of these plants, that is to say, how the plants can be used to produce the greatest amount of human happiness.

Hence there are three distinct classes of subjects in a complete course of Scientific Agriculture.

I. The first class treats of the nature, quantity, and sources of plant-food.

The science concerned in this are—

1. Chemistry.
2. Mineralogy.
3. Geology.

These studies are distributed into three classes—

1. Junior Class.—The study of this class is General Chemistry (Inorganic.)

2. Intermediate Class.—General Chemistry (Organic) Mineralogy and Agricultural Chemistry.

3. Senior Class.—Analytical Chemistry, Agricultural Chemistry and Geology.

II. The second class of studies treat—

1. Of the methods of changing plant-food into plants.

Here belong—

1. The methods of rendering potential plant-food actual, or of preparing the food for the plant (such methods are rest, fallow, rotation, green crops, mechanical improvements, etc.)
2. Drainage.
3. Botany.
4. Entomology.
5. Meteorology.
6. Forestry.

These studies are divided into three classes—

1. Junior Class.—Soils, and methods for rendering potential plant-food actual, Botany.

2. Intermediate Class.—Same subject continued, grass, and fruit culture.

3. Senior Class.—Drainage, Meteorology, Entomology, Forestry.

III. The third class treats of the use of plants and considers the best methods for such uses.

Here belongs—

1. Harvesting and preservation of crops.
2. Stock-breeding (including physiology and zoology.)
3. Farm engineering (including drawing and construction of farm buildings)
4. Landscape gardening.
5. Political economy.

These studies are divided in three classes—

1. Junior Class—Methods of harvesting and preserving crops, Farm Engineering, Physiology.

2. Intermediate Class—Drawing, Zoology, Stockbreeding.

3. Senior Class—Drawing, Stockbreeding, Landscape Gardening, Political Economy.

Preparation needed for entering these courses of study—Algebra, and Geometry, and such studies as prepare for Algebra and Geometry.

STATEMENT OF WORK DONE BY EACH TEACHER OF THE SCHOOL.

1. B. L. Arnold.

During the past two years I have taught Chemistry, Physics, Mechanics' Logic, Mental Science, Ethics, Physiology.

Remark.—It is plain that we need more division of labor; it is mpossible for one man to teach so many things with success, without overtaxing his body and mind. It is greatly hoped that we hould soon receive relief from the Legislature. Time for study hould be allowed to every teacher and the teacher be required to tudy during that time. It is not possible, that persons unacquainted with educational matters, should know how needful it is that the eacher be a diligent student, hence he should have first, the time, econdly, the means for thorough study and investigation; it is better or teacher, pupil, parent and State.

The teachers in the Agriculture College are all so crowded with he work of teaching as to have but little time for study. We hope he Legislature will take this into consideration and give us funds enough to enlarge our faculty.

B. L. ARNOLD.

REPORT.

President B. L. Arnold:

SIR—Following is the report of my work for the past two years:

The subjects which I have taught during the period of time above mentioned are Latin, Greek, German, French, English and Freehand Drawing.

FREEHAND DRAWING.

The study of Freehand Drawing was here introduced two years ago, and is of great practical use to the farmer as well as to the mechanic. The most important and leading object in learning to draw is the acquirement of a clear comprehension of the nature and efficiency of the expression of simple lines, together with that of capacity for their execution. It has been said that "He who cannot draw a straight line, the simplest, easiest, and most comprehensive has certainly much to learn, and should begin with it. He that can has already made no inconsiderable advancement."

Recognizing the practical utility of this study, the Board of Trustees of this institution very generously appropriated a sum of money for the pnrchase of drawing-models.

The class, at present numbering thirty-eight, manifest a great interest, and are doing good work in drawing landscapes, water scenes, figures, animals and birds. The eye being thus quickened to just perception of form, the hand trained to executive readiness, the pupils will soon be ready for sketching exercises, which we shal introduce during the coming spring.

All the exercises of the students are carefully preserved, and, a far as possible, without blot or evidence of slight or carelessness They may not only be of individual interest to recur to with satisfaction at some future period of advanced progress, but serve t excite and encourage emulation, by exhibiting proofs of the eas and certainty of the way of its attainment.

ENGLISH.

Text Books—Swinton's Literature, Whitney's Grammar and thers. Some twenty compositions on agricultural and other topics re read and corrected every week. Reading of English Classics.

GREEK AND LATIN.

Text Books—W. W. Goodwin's Grammar and S. W. White's Exerise Book for Greek, and Gildersleeve's Grammar, Exercise Book and eader for Latin. Composition work, and Reading of Greek and atin Classics, as prescribed by the State.

GERMAN.

As in all other languages, so is the course here divided into four lasses:

Freshman—Study of W. H. Whitney's Grammar and Reader. asy translations from German into English, and English into erman.

Sophomore and Junior—Grammar as above. Reading of good erman authors; translations; easy German compositions.

Junior—Reading and translations; best German authors; comositions; letter writing; conversation.

FRENCH.

The study of this language is pursued in very much the same anner as that of German.

Text Books—Tasquelle's French course; translations; composiions; reading of good French authors.

Very respectfully,

F. BERCHTOLD.

December 15, 1886.

REPORT

Of the Professor of Agriculture and Chemistry.

To the President:

I herewith submit the following biennial report of the department of Agriculture and Chemistry:

AGRICULTURAL CHEMISTRY.

I have given instruction to the Senior Class in Agricultural Chemistry, using Tanner's Science of Agriculture and Johnson's How Crops Feed, as text-books.

During the year the following topics were fully discussed: The Origin and Formation of Soils, Chemical Composition of Plants Source and Relative Abundance of the Elements of Plant Growth Physical and Chemical Properties of the Soil, etc.

The student is thus brought to see the great importance of an intimate acquaintance with the chemical elements of soil and atmosphere, and to know which of these are essential to plant growth How to influence the subserviency of these elements to his purposes by the mechanical operations, such as drainage, fallowing, rotation of crops, etc., are fully discussed.

During the session of 1885-86 the class in Agriculture studied Animal Feeding, using Stewart as a text-book. The object of introducing this study was to give a connected course of study from the preparation of the soil to the marketing of the crop, in the form of grain, or beef, mutton, wool, etc. The following are some of the topics discussed:

Chemical composition and digestibility of various feedstuffs; nutrative ration; the most profitable combination of feedstuffs for the production of beef, pork, etc., as determined by American Experimental Stations; soiling; soiling crops; ensilage; ensilage crops ıre of manure; money value of feedstuffs; preparation of food; arıngement of barns, etc. The valuable experiments carried on at ıe experimental stations of Wisconsin, Michigan, Kansas and lissouri were carefully examined with the class. The student is ıus brought to see that it is not enough to raise large crops, but ıat it is of equal importance to know how to use them so as to aintain the fertility of the land and yet put his crop in the market ı the most valuable form.

PRACTICAL AGRICULTURE.

I delivered a course of lectures to the Freshman class on stock ıd stock breeding, in which are discussed the various breeds of ıttle, sheep and swine, their history, peculiarities, adaptation to ırious sections of Oregon as determined by climate, soil, food and arket.

BOTANY.

The class in Botany has used Wood's Botanist and Florist as a xt book. The student is made familiar with the various parts of e plant, and their technical names, and the principles of classifiıtion, and then given plants to study. The class has manifested nsiderable interest in the study. Each student, on an average, has llected and identified sixty plants. Special attention is given to ıe identification of agricultural plants, such as the clovers and asses. Each student provides himself with a microscope and ɔes his own work without assistance from the teacher. The stuınt thus comes to have confidence in his own work, and takes a eater interest in the study than he otherwise would.

POLITICAL ECONOMY.

In Political Economy I have used Chapin's Wailand's Political conomy as a text book.

The following are some of the topics discussed:

Production, Division of Labor, Capital, Co-operation of Labor ıd Capital; Distribution, Remuneration of Labor; Leading Considations which Determine Rates of Wages, The Effects of Strikes, sury Laws; Exchange, Money and Credit as Instruments of Exıange, Banks, Protective Laws, etc.

The last term was devoted to the study of "Laughlin's Mill's olitical Economy," which time was devoted more especially to the udy of current practical problems in industrial society in the light f economic principles.

CHEMISTRY

In the department of chemistry I taught a class in inorganic and one in organic chemistry. I have used Roscoe's Elements of Chemistry as a text book, illustrated by appropriate experiments, as far as our limited supply of apparatus will permit. The student is made familiar with the history of chemistry, laws of chemical combination, chemical affinity, elementary substances, history, distribution, preparation, properties and uses; application of chemistry in the arts and manufactures. I have been able to do but little work in analytical chemistry.

The class spent one hour each day in the last term in the use of the blowpipe and the determination of minerals.

This should be followed by a course in volumetric and qualitative analysis; but having no room for carrying on this work, nothing has been done in this direction. It is to be hoped that this part of the work will be better provided for in the future.

AGRICULTURAL EXPERIMENTS.

During the session of 1885–6 additions were made to the number of plots reported in 1885. Several varieties of grasses, clover wheat and oats were added by the students. I think it very unfor tunate that this department had to be discontinued for lack o funds. While the plots were small, 35x12 feet, yet they gave valu able indications of the value of the various grasses and clovers growing on them. The importance of the study of the grasses and forage crops can hardly be overestimated. Every agricultura country some time in its history must be brought to see the neces sity of having good pastures. The Ontario Agricultural College as well as some schools in the United States, have shown that th cheapest food for animals comes from pastures of mixed grasses and clovers. Many of our farmers are sowing their land to grass What shall we sow? is often asked. Many are sowing grasse known to be inferior in quality because known to be good i quantity. An agricultural college ought to remove the doubts an uncertainties of agriculture as far as possible and create an atmos phere which shall permeate and influence the farmers beyond th bounds of the class room.

E. GRIMM,
Prof. Agriculture and Chemistry.

REPORT

Of the Professor of Mathematics and Engineering.

o the President of the Faculty:

I herewith submit my report for the School of Mathematics and ngineering:

I have taught the course of study as prescribed by the State and ublished on the first pages of this report. In the Freshman and ophomore years Davies' text books are used, in the Junior Olney's eneral Geometry and Calculus, and in the Senior Olmstead's Asronomy and —— Civil Engineering. To this school is also asigned the study of Geology. I have shared in instructing English rammar.

ENGINEERING.

Previous to this time Engineering has been taught only to the xtent of surveying, supplemented by a few lectures by the Proessor, and the course of study has not called for more than this. ursuant to the resolution of Board of Trustees, that a mechanical epartment be organized, I have made a beginning in this line and ill push its establishment as rapidly as times and means will allow. o establish this department on a practical working basis will reuire some time or a large amount of money. At present it is posible to teach only the theoretical part of this important subject, and hus fit the student for rapidly acquiring the practice hereafter. I herefore submit this prospectus, hoping that in the near future the tate will furnish the means to carry it out.

The course of study will embrace—(1.) Mechanical Drawing; (2.) urveying and Location; (3.) Mechanics of Engineering and Techical Engineering; (4.) Shop Work.

MECHANICAL DRAWING.

This will include Projection Drawing, with its applications to deigning and framing structures in wood, masonry and iron; sometric and Oblique Projections; Shades and Shadows; Linear erspective; and Elements of machines.

SURVEYING AND LOCATION.

This will include surveying, plotting and calculating the area, leveling, with its applications to grading and locating ditches, diviving up land, and laying out and construction of roads.

MECHANICS OF ENGINEERING AND TECHNICAL ENGINEERING.

The determination of strains and stress in framed structures; pressure in brick and stone work; the selection and arranging of materials to resist these forces; laying foundations of large buildings and of bridges, as well as designing the structures themselves.

SHOP WORK.

This will be instruction and practice in working in both wood and metals; working to drawings, pattern making and framing, casting and forging, as well as regular machine-shop work. To give the student such a knowledge of the theory and practice of these useful arts as will enable him to compete successfully with those practicing them, will be the design in the work of this school.

To establish the shops necessary for this training will cost a large amount of money, but the appliances necessary for training in the remaining parts of Engineering need not cost above a few hundred dollars, and it is to be hoped that these will soon be supplied. A compass, transit, Y level, rod and chains will be needed for instruction in surveying and location and topography.

A few sets of carpenters tools will be needed when a room to work in can be provided. This will make a beginning toward shop-work and will furnish the means for making the models required in the drawing work.

Respectfully,
T. P. BRANCH,
Prof. of Mathematics and Engineering.

EXPERIMENT STATIONS.

Experimenting is so expensive and laborious, and requires atten-
n to so many exact conditions, when well done, that several of
States have established Experiment Stations to supplement the
rk of their Agricultural Colleges. Experiments, when improperly
de, are worse than useless; for they involve a waste of money,
e and labor to no purpose whatever. I quote from the language
Dr. Gilbert, who was for many years with Mr. Lawes during his
ebrated experiments, and who is now Professor of Agriculture in
ford, England.

'I have already quoted the opinion of Sir Humphrey Davy, that
entifically conducted field experiments should be undertaken by
prietors of land who, by their education, are fitted to form en-
htened plans, and by their fortunes are able to carry them into
cution; and when I tell you that the Rothamstead field exper-
ents, independently of all the laboratory investigations connected
h them, cost considerably more, and those which have been un-
taken by the Duke of Bedford, at Woburn, for the last seven
rs, on behalf of the Royal Agricultural Society of England, and
ich are under the direction of Dr. Voelcker, not much less than 1,000
nds ($5,000.00) annually, you will not be surprised that such
d experiments are not more general." "At the present time the
thamstead staff consists of two, and sometimes three chemists,
eral general assistants in different departments, occasionally a
otanical assistant, three, and sometimes four, computors and
rd-keepers; also, a laboratory man and several boys."

wish to remark in passing that—

1.) These experiments of Mr. Lawes are carried on at private
ense, hence we may expect economy.

2.) There is no teaching to be done by the experimental corps.

3.) That Mr. Lawes uses only small plats of land.

4.) That his whole expense for field experiments is from $15,000
20,000 a year.

.) That there is a bill before Congress which gives to each Agri-
tural College for experiments $15,000 a year.

(6.) The following letter, addressed by Agricultural Colleges to Representatives and Senators, shows some of the reasons why this bill should pass.

(7.) The Agricultural College of Oregon is weak in funds, and especially needs this appropriation.

(8.) It seems to me the duty of our Legislature to memorialize Congress for this purpose, viz: That the aforesaid bill should pass.

To the Hon. ----------------

The Congressional bill, known as the Hatch bill, To establish agricultural experiment stations, has been favorably reported by the Committee on Agriculture, and its passage recommended. It is now before Congress, and ready to be acted upon; and you are earnestly requested to give it that consideration which its importance entitles it to receive.

This bill proposes to provide such stimulus for agricultural improvement as the patent laws do for mechanics, manufacturers and artists, and the copyright laws for authors. This seems to be the only way in which such an end can be reached. Farmers cannot maintain a personal right to improvements in tillage, in crops, in stock-breeding, in overcoming the diseases of animals or plants, or in withstanding the attacks of insect enemies. However much of labor, or study, or money the farmer may expend for either of these, his neighbor can imitate his work and get as much profit from it as he himself can, and that without asking permission or expressing thanks. Some action of the sort proposed by this bill may fairly be asked, in order to put agriculture on a par with the other industrial ats.

Agricultural Experiment Stations carry on investigation in subjects of the greatest importance to agriculture, by the use of the accurate methods and processes of chemistry, botany, entomology, physiology, and kindred sciences. The analysis and management of manures, the production and adaptation of new varieties of seeds and crops, the destruction of injurious insects, the protection against contagious diseases of animals, have all been the subject of successful and satisfactory investigation in Experimental Stations. Wherever they have been established they have proved themselves of great benefit to farmers, and have received their hearty and unanimous support. There are a hundred or more of them in various countries of Europe, and in our country they have been established in Connecticut, North Carolina and New Jersey for several years, and are highly valued. More recently they have been established in New York, Ohio, Wisconsin, and some other States, and are doing good work.

When the interests involved are looked at, it will be seen that the outlay contemplated by this bill is exceedingly small, fifteen thousand dollars ($15,000) a year for each State or five hundred and seventy thousand dollars ($570,000) for all the States, while seven million five hundred thousand (7,500,000) men, which is forty-four (44) per cent. of our working population, are engaged in agriculture; ten thousand million dollars ($10,000,000,000) are invested in farm lands, four hundred million dollars ($400,000,000) in its implements and machinery, fifteen hundred million dollars ($1,500,000,000) in its live stock, and its annual products are twenty-two hundred million dollars ($2,200,000,000). Surely the farming community may ask this comparatively small provision for their interests.

The bulletins publishing the result of the work of the State Experiment Stations are printed as soon as the work is done, and sent without charge to farmers who desire them, and they are producing a great revolution in farm economy wherever their influence extends. The benefits of intelligence and skill in farming make themselves felt wherever they are applied. To produce these, no other means equal to that of Agricultural Experiment Stations have been devised, and no thrifty and progressive farming community can afford to do without them.

The establishment of these stations in connection with the Agricultural Colleges will be strengthening to both. The Colleges have done excellent work, and have given a large return to the country for the gifts by which they were established. The $7,000,000 fund created by the gifts of the government has been supplemented by $5,000,000 more from States and benevolent individuals. The Colleges have been established in all the States, and more than 4,000 students are profiting from the instructions of above 400 Professors.

These institutions mainly teach the branches of learning which relate to agriculture and the mechanic arts, while the Experiment Stations apply these branches of learning to the practical wants of the agriculturist.

The studies begun by the students in College are carried on by the practical farmer in the field, and the College Professors will be quickened in their duties by seeing the useful purposes to which their sciences are applied. It brings learning and work fairly in connection, and meets a pressing demand of the age.

The advantages to be secured by the passage of this bill are wide and far reaching, both for the farmers and for the whole country; and the interests which it is intended are so vital to the prosperity of the whole country as to be entitled to the fostering care o the general government.

Trusting that these suggestions will commend themselves to you favorable consideration, we ask for the bill your earnest support.

Yours very respectfully.

STUDENTS FOR THE YEAR 1885-86.

J. C. Applewhite,
J. P. Teller,
W. B. Rohrer,
H. T. Bell,
H. Kittridge,
T. Allen,
G. E. Waggoner,
John Campbell,
H. C. Hinton,
Chas. Atwood,
H. J. Phillips,
F. E. Brallier,
Chas. D. Thompson,
W. C. Taylor,
O. W. Montgomery,
W. S. Stock,
S. S. Meads,
Frank Williams,
R. E. Cooper,
Willard Cauthorn,
Edgar Schott,
John Buchanan,
Chas. Taylor,
J. R. Kerr,
T. D. Waugh,
E. T. Holgate,
Will Hall,
B. S. Martin,
G. H. Skeels,
H. L. Holgate,
L. Kearney,
O. W. Waggoner,
O. W. Robbins,
J. H. Ricard,
W. Dreskill,
O. M. Rose,
Chester Avery,
J. H. Collins,
B. F. Collins,
J. W. Lewis,
J. Wilkins,
Oliver Altree,
Osborne Davey,
T. A. Horning,
F. W. Rayburn,
Blake Cauthorn,
James Horning,
R. G. Buchanan,
Grant Mulkey,
C. A. Davis,
L. J. Kemp,
J. G. Bennett.

STUDENTS FOR THE YEAR 1884-85.

C. D. Thompson,
J. E. Whitney,
Geo. W. Slayton,
Will Hall,
O. L. Hall,
Alterius Giesy,
O. W. Robbins,
James Lewis,
J. H. Rickard,
B. S. Martin,
Frank Davis,
J. C. Applewhite,
M. B. Short,
Fred A. Horning,
J. J. Sturgill,
Geo. E. Lilly,
Clyde Beach,
C. B. Gaines,
R. S. Buchanan,
H. L. Holgate,
J. Fred Yates,
Geo. E. Waggoner,
George Nelson,
A. S. Buchanan.

W. H. Heisler,
Fred Rayburn,
W. Rees,
Edwin Cooke,
J. P. Feller,
Arch Horning,
Herbert Kittridge,
Ira Allen,
W. H. Newton,
E. U. Will,
B. F. Collins,
T. Elliott,
R. E. Cooper,
S. J. Vaughn,
Chester W. Skeels,
Alonzo Allen,
G. F. Hoffman,
R. Abbey,
W. R. King,
M. Martin,
O. W. Waggoner,
J. G. Bennett,
Leslie Lilly,

FINANCIAL STATEMENT

FOR THE SESSION OF 1884-85.

RECEIPTS.

Received from State Treasurer	$ 5,066 63

DISBURSEMENTS.

Paid teachers	$ 7,800 00
Paid Secretary and Treasurer	100 00
Paid janitors	111 90
Paid for supplies	200 00
Paid for printing and advertising	105 05
Paid for incidental expenses	184 59
Paid for books	100 00
Total	$ 8,601 35

FINANCIAL STATEMENT

FOR THE SESSION OF 1885-86.

RECEIPTS.

Received from State Treasurer	$10,050 32

DISBURSEMENTS.

Paid teachers	$7,844 43
Paid Secretary and Treasurer	100 00
Paid janitors	120 50
Paid for printing and advertising	49 45
Paid for supplies	154 01
Paid for incidentals	201 98
Total	$8,470 37

FIFTEENTH BIENNIAL REPORT

OF THE

Oregon State Agricultural College,

TO THE

LEGISLATIVE ASSEMBLY.

FIFTEENTH REGULAR SESSION.

1889.

SALEM, OREGON:
FRANK C. BAKER, STATE PRINTER.
1889.

FIFTEENTH BIENNIAL REPORT

OF THE

Oregon State Agricultural College

TO THE

LEGISLATIVE ASSEMBLY.

FIFTEENTH REGULAR SESSION.

1889.

1859

SALEM, OREGON:
FRANK C. BAKER, STATE PRINTER.
1889.

State Agricultural College,
Corvallis, Oregon, December 28, 1888.

To His Excellency, Sylvester Pennoyer, Governor of Oregon:

Sir: I have the honor to transmit herewith the reports of the president of the board of regents of the State agricultural college of Oregon for the years 1887 and 1888.

Very respectfully,
WALLIS NASH,
Secretary.

REPORT.

State Agricultural College,
Corvallis, Oregon, December 28, 1888.

To His Excellency, Sylvester Pennoyer, Governor of Oregon:

Sir: Although the law constituting the present board of regents was approved on February 11, 1885, and the amendatory Act on November 21, 1885, yet under the conditions of those laws the board of regents did not, and could not, assume the control and government of the college until the second day of July, 1888. It is true that various meetings of the board were held at intervals between the times that the several members of the board received their commissions from your excellency, and the second of July, 1888. Those meetings had for their objects, first, to obtain the provisional conveyance to the board of the college farm from the former trustees, who were the custodians of that farm for the State agricultural college, but who, for executing that trust, were the agents and nominees of the South Methodist Church; and, second, after such conveyance to the State board of regents had been duly made and accepted, to organize and carry out the necessary legal measures to defend the right of the State of Oregon in and to the agricultural college farm against the attempt of certain individuals claiming to be members of the South Methodist Church, and to act on behalf of themselves and other members of that church to dispossess the State board of regents and to nullify the deed conveying the farm to the State board.

That claim took the form of a suit in equity brought in the circuit court of the State of Oregon for Benton county.

Under the advice of the able counsel, instructed by the State board, a demurrer was interposed and was sustained by Judge Bean in an exhaustive opinion.

Meanwhile the citizens of Benton county had proceeded, in good faith and in reliance on the deed of conveyance of the college farm to the State board, above referred to, to comply with the provisions of the legislative Acts of 1885, and to erect on such farm a substantial and very commodious and suitable brick building at a cost of upwards of $23,000.

The conditions of the Acts having thus been complied with, by the conveyance of the farm to the State board of regents, and by the erection thereon of a building which abundantly filled the requirements of the law, you, as Governor of Oregon, accepted the building, after a full personal inspection of the same, and placed the State board of regents in possession by handing them the keys of the college.

The plaintiffs in the Church suit subsequently obtained, on appeal to the supreme court of Oregon, a judgment reversing Judge Bean's sustainment of the demurrer filed by the State board. If the judgment of the supreme court is confirmed on the rehearing which has been applied for and granted, no alternative will remain for the State board but to continue the litigation on the merits of the case until a final judgment is rendered.

The State board of regents believe, and are advised, that the courts of law, and not the legislature of Oregon, present the proper forum for ascertaining whether the Southern Methodist Church or the State of Oregon is entitled to the control and management of the State agricultural college, and to the ownership of the college farm originally bought by its donors, and conveyed for the perpetual benefit of the State agricultural college.

But the State board of regents, appointed by the Governor of Oregon, confirmed by the senate of Oregon, and assuming to act in strict accordance with the laws of 1885, would consider that they were wanting in their duty to the State and to its citizens, if they failed to protect to the best of their ability the ownership of the State of Oregon in the property conveyed to them—the college building erected by the public spirit and liberality of Benton county, and the State agricultural college and all that belongs or is attached to it.

It is well to call to mind, before leaving this subject, that the surrender of the agricultural college to the State of Oregon, and the conveyance to the State board of regents of the college farm, were voluntary acts on the part of the Southern Methodist Church, which became fixed and binding forever on all parties—according to the opinion of the State board of regents and their counsel—when finally acted on and crystallized in the legislative Acts of 1885, and still further confirmed, in all good morals, by the Benton county subscriptions and the erection of the new building.

A reasonable appropriation will be asked from the coming legislature to defray the expenses of this litigation in defense of what are believed to be the rights of the State of Oregon.

From the foregoing statement of facts it is hoped that it sufficiently appears that the State board of regents were in the plain line of duty in accepting, on July 2, 1888, the control and management of the State agricultural college in the terms of the law governing their appointment. Some months prior to this last mentioned date your excellency, as Governor of Oregon, had designated the board of regents of the State agricultural college as the authority to receive, on behalf of the State of Oregon, and to disburse the funds appropriated by congress by what is known as the Hatch Act, constituting experiment stations in the several States and Territories, and appropriating for each State and Territory the sum of $15,000 per annum.

The State board made the necessary application to the United States treasury for payment over of these funds. They were assisted in their effort by the Oregon delegation in congress, and in this connection Senator Dolph must receive special recognition and acknowledgement for the aid he rendered. After much correspondence the treasurer received on April 25, 1888, the installments then payable of the first year's appropriation, amounting to $11,250.

The board proceeded as soon as they could to organize the experiment station and to appoint the necessary officers. When dealing later on with the progress of the work further mention will be made of what has been done already, and of the plans of experiment laid down for the future for our Oregon station under the Hatch Act.

Early in the month of June, 1888, the State board were notified by the building association (an organization formed by the subscribers to the building fund of the new college) that the college was rapidly approaching completion, and would be ready to be handed over to the State in a short time. Your board consequently were summoned to meet at Corvallis, and eleven out of the thirteen members responded to the call.

Committees having been appointed on nomination of faculty and on course of studies to be adopted, and having duly reported thereon, the plan of study was selected, which appears more fully in the report of the president of the faculty, which is attached hereto. In framing this most important plan special care was taken to conform to the law under which the Oregon State agricultural college was organized, which enacts, as the particular features of the teaching in such colleges, instruction in "agriculture and the mechanic arts." In laying down this plan of work the State board were well aware that they were laying a broader foundation than the means at their command would enable them to build on at first. With the amount of income at their disposal it is not practicable, now, to find means to pay professors and instructors in all the studies proposed, and to meet this difficulty for the present the several members of the faculty have undertaken more work and a wider range of subjects than the special subjects for which they were engaged would call for. Fortunately the income of the institution is a yearly growing one, and the board will seek to widen the usefulness of the State agricultural college as the funds will permit.

The board know that in all such colleges there is now, and probably always will be, a just balance to be sought between what are known as the theoretical and the practical sides of the education there offered.

Fortunately they are not pioneers in this matter, and need have recourse to few experiments. The experience of all agricultural colleges of the United States, as well as those in Canada, and in several European countries, has brought out various principles which it is safe to follow, and which the State board of regents have endeavored to follow in the plans they have laid down for the Oregon college.

The first is that agriculture is a science, and not an art, and must therefore be taught on scientific principles. That is to say, that the farmer deals with natural forces in the soil, in the atmosphere, and the products of the farm, both animal and vegetable, and that he cannot secure the best results from his farm without such a thorough and systematic training in the natural sciences as will teach him to use the forces nature has provided there for him. In other words, science must teach him *what to do.*

The second principle is that this scientific teaching is the foundation on which practical results must be built up, that therefore actual experimental knowledge of the processes of the farm is just as needful as the scientific training which must both precede and accompany it. Good practical experience must teach the farmer *how to do it.*

The success of any agricultural college must depend on the wise and careful application of these principles. It can now be determined if the present board of regents have judiciously used the experience of precedents of other such institutions in laying down the organization of the college. It remains to be seen if they have shown good judgment in the selection of a faculty for carrying these ideas into practical working.

If their plans and ideas are approved, the coming legislature of Oregon will, it is earnestly hoped, strengthen their hands and help the carrying out of their purposes by appropriations of the public funds to enable them to provide the means of extended usefulness for the college. And, if experience should prove that changes in the faculty are needed for the good of the college, the board of regents will make such changes fearlessly, and with a single eye to the advantage of the students.

It must not be forgotten that it is too early to look for results as yet. A certain amount of indecision and friction is absolutely inevitable when a body of teachers is collected from all points of the compass and set down to teach a large collection of students, to whom everything is, of necessity, strange. The board congratulate themselves that so short a time as that since the middle of September, 1888, has served to settle matters into so satisfactory a condition of hard and creditable work. The report of the treasurer will show what funds have been received and how expended.

Referring again to the Hatch law, the sum of $15,000 in all has been received by the treasurer. The law authorizes the expenditure of one-fifth of this amount on buildings. The board of regents have utilized this sum in completing and fitting up in the college building chemical and botanical rooms and laboratories. The balance of the appropriation for 1888 the board apportioned among the several departments, in accordance with carefully considered plans. They have called on the various officers for suggestions for future work, and only wait to know that congress has generously renewed the annual appropriation, to inaugurate the operations of the coming year. This work will embrace the opening of branch stations in various parts of Oregon, where special experiments, having reference to the exigencies of the different sections of the State, will be carried on. Of course it appears from this report that the work up to this time is largely that of organization.

The college building at Corvallis, and the farm of 35 acres on which it stands, may be considered to afford the means for the scientific teaching to which reference has been made. But only to a limited extent can the practical work of the farmer, the dairyman, the stock raiser, and the horticulturist be carried on there.

The State of Oregon can supply, if she will, the means for establishing and working a model farm, and a model dairy in connection with it. It is generally considered that not less than 200 acres more land is most desirable, if not absolutely essential to these ends.

There is every probability that suitable acreage can be obtained, at a moderate price, near to the college farm, and so situated as to afford the desired opportunities for learning to the students.

It is, perhaps, not improper to mention that there is hardly one progressive State which has not provided for its agricultural college the lands for its purposes. Among these States Illinois has given 400 acres for general and stock farming and 180 acres for an experimental farm, including 20 acres of ornamental grounds.

Iowa has given 895 acres; of this 130 acres is for horticulture and ornamental grounds, and 465 acres in actual model farm.

Kansas has given two farms, of 171 acres and 100 acres.

Massachusetts has given 383 acres; of this from 10 to 15 acres are orchards, and they have a nursery containing over 25,000 trees, shrubs, vines, etc.

Michigan has given 676 acres for farm and park, of which 270 acres are for the experimental farm.

And these are samples of the rest.

In order to give the students training in handicrafts, the other States have provided workshops, in wood and in metals, and have fitted up the same with costly machinery and tools, and so carried out the conditions of the original Act that education in the agricultural college should be given in the *mechanic arts* as well as in agriculture.

Oregon has not hitherto followed the good example of her elder sisters

In order to make the agricultural colleges complete and well fitted for their most important work, other States have made during the four years ending 1887 the following appropriations, the same being always entirely exclusive of all income derived from the land grants:

TABLE

Showing State appropriations for State agricultural colleges.

State.	1886-7	1884-5	Total.	Remarks.
Colorado	40,000	36,000	76,000	Agriculture and mechanics alone.
Illinois	55,500	54,500	110,000	All departments.
Indiana	60,500	45,000	105,000	All departments.
Iowa	7,800	34,600	42,400	Agriculture and mechanics alone.
Kansas		----------	150,000	For buildings only.
Maine	34,600	12,400	47,000	Agriculture and mechanics alone.
Massachusetts	52,000	34,000	86,000	Agriculture and mechanics alone.
Michigan	110,000	----------	110,000	Agriculture and mechanics alone.
Minnesota	75,000	58,000	133,000	All departments.
Mississippi	50,000	65,000	115,000	Agriculture and mechanics alone.
Nebraska	*120,000	----------	120,000	All departments.
Ohio	30,000	44,950	74,950	Agriculture and mechanics alone.
Pennsylvania	*112,000	----------	112,000	Agriculture and mechanics alone.
Texas	35,000	30,000	65,000	Agriculture and mechanics alone.
West Virginia	40,000	33,000	73,000	Agriculture and mechanics alone.

*And over.

Other States have done well, but their reports are not at this moment accessible.

Enough appears in the foregoing table to sustain the assertion that abundant examples and precedents exist to sustain the legislature of Oregon in adding largely to the annual appropriation of $2,500 made by the last legislature for the benefit of the State agricultural college, if they are satisfied that the expenditure of the money appropriated will be wisely carried out.

The agricultural college of Oregon will not be fully equipped for her great work, and will not hold the same rank as the colleges of other States, which are not more than her peers in the great sisterhood, until the following outfit has been provided:

1. Mechanical building, with machinery for working in wood and iron.
2. Dairy—model creamery and cheese factory.
3. Stock barns, piggery, veterinary building with hospital and museum.
4. Horticultural buildings, herbarium and museum.
5. Model kitchen—appliances for preparing, preserving and evaporating fruits.
6. Students' hall and dormitories, with accommodations for not less than 200 students.
7. In the stock farm, representative and pedigree examples of the various breeds of cattle, horses, sheep and pigs.
8. In the horticultural department, orchards, nurseries and

experimental grounds for testing, improving and adapting frui trees, vines, nuts and vegetables.

It is for some or all of these purposes that the considerabl appropriations tabulated above have been made by other States.

Naturally the institution cannot expect all of these acceesories a once. The work of development will depend on the wisdom an generosity of successive legislatures. But it is hoped that a substantial amount may be appropriated by this present legislature.

While all are desirable, some of these objects are really necessar now, and the board feel it to be their duty to give expression t their hope that they may be enabled to expend the following sums

Four thousand dollars on a mechanical building; $3,500 on machinery and equipment; $2,000 on dairy, creamery, etc.; $4,000 o stock barn, piggery, veterinary building and hospital; $1,500 o kitchen, fruit canning and evaporating appliances; $5,000 on dormitories and students' hall—total, $20,000.

To this should be added $10,000 for the purchase of lands, an then Oregon, with an expenditure on capital account of $30,000 b the legislature of 1889, would still be only in the rank with Wes Virginia, Texas and Colorado, and not up in line with the olde States.

It is hoped that besides an appropriation of not less than th $30,000 above referred to, an appropriation of not less than $5,00 per annum may be made in aid of the income of the college fo payment of professors, teachers and current expenses.

No one can travel through Oregon who has lived in any one o the older States, or been made conversant with the improved method in agriculture which are now in all but universal use, withou recognizing the fact that the vast natural advantages of Oregon ar not half utilized. What a vast increase will there be in the wealt of Oregon when her farmers are instructed in a few of the principle involved in rotation of crops and the general raising of the standar of the herds and flocks of the State. And the enlarged yield of th farm means more comforts in the home.

With the increased comforts of the home the attractiveness of th home to the boys and girls will correspondingly grow, and less wil be seen of that tendency to forsake the farm and enter on th uncertainties of a business life, or still further crowd the profession which is the too common complaint of the Oregon farmer of to-da

It is no light or unimportant matter, then, to develop the usefulness of the State agricultural college in all these respects. Knowledg gained by study and tested and confirmed by experiment is wha the State agricultural college is framed and organized to extend and sow broadcast over Oregon by the influence of the college students, as they diffuse themselves among the farming community of the State.

The board of regents must now leave the matter to the wisdom of the legislature, of whose hands they crave a prudent, but yet generous appropriation, to enable them to provide things necessary and desirable for the high purposes this college is intended to fulfill.

Respectfully submitted,
W. S. LADD,

President of Board of Regents of the State Agricultural College of Oregon.

ORGANIZATION.

The new building for the agricultural college having been completed by the citizens of Benton county and accepted by the Governor, as required by the legislative act of 1885, the State board of regents met in Corvallis on the second of July, pursuant to a preliminary meeting of the same body held June —, and organized both the experiment station and the college; organizing the college in accordance with the congressional Act of 1862, and the station under the Hatch Act. They established eight chairs or professorships and a preparatory department, adopted a curriculum, appointed a teaching staff for the college and a director for the station, and later during the summer they appointed a chemist and a horticulturist, who, with the directors, constitute the station council.

DEPARTMENTS OF INSTRUCTION.

1. English language and literature.
2. Agriculture.
3. Chemistry and mineralogy.
4. Botany and horticulture.
5. Mathematics, surveying and engineering.
6. Modern languages.
7. Commercial law, physiology, elocution, mechanical drawing and free-hand drawing.
8. Household economy and sanitation.

FACULTY.

B. L. Arnold, A. M., president and professor of English language.
E. Grimm, B. S., professor of agriculture.

J. D. Letcher, C. E., professor of mathematics and engineering.

F. Berchtold, A. M., professor of modern languages.

W. N. Hull, A. M., professor of commercial law, physiology and mechanical drawing.

W. W. Bristow, A. B., professor of bookkeeping and bee culture; also principal of the preparatory department.

E. R. Lake, M. S., professor of botany, horticulture and entomology.

P. Herbert Irish, Ph. D., professor of chemistry.

——————————, professor of household economy.

COURSE OF STUDY.

FIRST YEAR.

Fall Term.—English grammar, algebra, elementary chemistry, free-hand drawing, modern languages (elective), and an industrial.

Winter Term.—English grammar, algebra, U. S. history, agriculture, botany, elementary chemistry, free-hand drawing, modern languages (elective), elocution, and an industrial.

Spring Term.—English grammar, algebra, U. S. history, elementary chemistry, botany, agriculture, free-hand drawing, modern languages (elective), elocution, and an industrial.

SECOND YEAR.

Fall Term.—Rhetoric, logic, agriculture, geology, physics, botany, geometry, modern languages (elective), book-keeping, physiology, free-hand and mechanical drawing, and an industrial.

Winter Term.—Rhetoric, logic, agriculture, physics, physiology, horticulture, geometry, modern languages (elective), free-hand and mechanical drawing, book-keeping, and an industrial.

Spring Term.—Rhetoric, logic, agriculture, physics, horticulture, entomology, trigonometry, modern languages (elective), free-hand and mechanical drawing, book-keeping, physiology, and an industrial.

THIRD YEAR.

Fall Term.—Political economy, stock breeding and dairy farming, geology, laboratory work, entomology and bee culture, surveying, language (elective), free-hand and mechanical drawing, farming book-keeping, farming and commercial law, and an industrial.

Winter Term.—Political economy, stock breeding, dairy farming, geology and laboratory work, entomology, orchards and gardens, leveling and draining, languages (elective), free-hand and mechanical drawing, farming book-keeping, farming and commercial law, and an industrial.

Spring Term.—Political economy, experiments, zoology, veterinary, metals and laboratory work, forestry and bee culture, road engineering, modern languages (elective), free-hand and mechanical drawing, farming book-keeping, farming and commercial law, and an industrial.

POST GRADUATE YEAR.

Fall Term.—Constitutional law and literature, farm implements, harvesting, geology, organic chemistry and analysis, economic value of forest and timber, microscopic botany, mechanics or astronomy, language (elective), physiology, sanitation.

Winter Term.—Constitutional law, literature, agriculture, geology, chemistry, botany, civil or mechanical engineering, astronomy, modern languages (elective), physiology, sanitation.

Spring Term.—Constitutional law, agriculture, geology, chemistry, landscape gardening and floriculture, mechanical or civil engineering, modern languages (elective), physiology, sanitation.

EXPENSES.

Tuition is $5 per term, or $15 per session for each student.

Students holding State appointments have free tuition.

Board and lodging may be had in town at reasonable rates.

All male students will be required to wear uniforms, which can be procured at Corvallis at a cost not exceeding $15.

EXPERIMENTAL STATION.

The work of the station will be a prominent feature of the institution. Bulletins will be issued in the near future, giving such information as may be thought of interest and importance to the public, and copies will be forwarded to every patron of the college.

REMARKS ON THE CURRICULUM.

It will be found upon examination that the following subjects in the curriculum are not provided for in the faculty. These subjects had to be distributed among the several members of the faculty, namely, geology, mineralogy, entomology, astronomy, meteorology, veterinary, landscape gardening and horticulture. The principle of distribution was the analogy between the assigned subject and the chair to which it was assigned; a better principle would be the tastes of the several teachers. It was expected that the chair of household science would be filled before the end of the term now closing, but the appointment has not been made, and this failure has created a hiatus which the faculty cannot bridge over.

None of the subjects named above have received any attention during the present term, nor can they receive any, with present arrangements, during the coming term. The reason is, that each teacher seems to be fully occupied with the duties proper to his own chair, and also because the students have been too much pressed with other studies to be able to do more. This leads me to remark that, in the judgment of the faculty, the curriculum is too extensive for the time allotted; that the course prescribed for three years is enough for four, at least, and they offer a scheme of instruction covering four years, which I herewith transmit most respectfully, and submit for the consideration of the board of regents. Two departures from the prescribed syllabus have seemed to me imperative. These consist in the organization of an algebra class in the preparatory department, and in the omission of elementary chemistry from the first year's college course. This change has not been made without hesitation. To speak of the latter change, the omission of elementary chemistry, it was necessary to omit something from the first year's course, or else institute alternate lessons, and this would have engendered either superficial work just where thorough work was most needful, or else establish very limited courses for the first year's studies. I foresee similar trouble in relation to other parts of the course.

It is, perhaps, expedient for me to call the attention of the board strongly to several difficulties in adopting any curriculum for an agricultural college. I shall not enter into detail. The first difficulty arises out of the *extent* of the course. If on the one hand the curriculum be less extensive than that of an ordinary college there is a loss of dignity and respectability, and with it a loss of the best young men and women, precisely those most needful for the present and future prosperity of the college. If on the other hand the course be equally extensive with that of an ordinary college, it is claimed that students are rather trained away from the farm than to it; but in either case the cause of agricultural education suffers. The second difficulty springs out of the relation between pure and technical studies; the technical depend on the pure for significance, and therefore come logically after the pure in order of time; hence, if the technical come too early in the course they cannot be understood; if too late they are never reached by the majority of the students. For instance, the subject of soils and fertilizers belongs in the course after the study of chemistry, and should chemistry fall on the second year, the consideration of soils and fertilizers would fall on the third year; but comparatively few students reach the third year. The third difficulty arises out of the want of a rigorous definition of studies; it is required, for example, that algebra, chemistry, constitutional law, etc., be taught, but the extent to which they shall be taught is left to the teacher's discretion, and here there is ground for friction. It might appear an easy matter to settle such questions, but it is not so by any means.

NEEDS.

1. Farm and equipments.
2. Mechanical building and equipment, the building to include armory and offices and headquarters for the military department, $10,000.
3. Boarding hall for students, $5,000.
4. Library, $700.
5. Institute work, $300.
6. For the several departments, $1,000.

SUGGESTIONS.

1. The board of regents should establish some degrees for graduation.
2. One of our most pressing wants is our need of an entomologist; a man to teach zoology, entomology and kindred subjects would be a great blessing to the institution and to the State, and such a man is indispensable to the station.
3. Household economy and sanitation are subjects of prime importance to the welfare of the family, and through the family, of the community, and this department should be filled as soon as convenient.
4. I should be glad to have authority to organize classes intermediate between those of the preparatory department and those of the first year's college course. This authority is not to be used without a necessity.
5. In the absence of other regulations for the government of the

students I ask for permission to enforce rigidly the following regulations, viz:

Every student who enters this school is received as a gentleman or lady; i. e., he is expected to speak the truth, be honest, be obedient to all rules expressed or implied, to be polite and respectful in his bearing toward fellow students and the faculty, and to visitors and employes, to be prompt, diligent, and attentive in his work, and whenever the college life of any student does not answer to these conditions, or to this character, he shall be sent to his parents or guardian.

STUDENTS.

THIRD YEAR.

	Names of Pupils.	Residence.		
		Town.	County.	State or Terr.
1.	J. G. Buchanan	Corvallis	Benton	Oregon.
2.	R. G. Buchanan	Corvallis	Benton	Oregon.
3.	H. L. Arnold	Corvallis	Benton	Oregon.
4.	J. C. Applewhite	Corvallis	Benton	Oregon.
5.	Jesse Wilkins	Corvallis	Benton	Oregon.
6.	A. S. Additon	Corvallis	Benton	Oragon.
7.	Thomas A. Jones	Corvallis	Benton	Oregon.
8.	C. C. Wilson	Corvallis	Benton	Oregon.
9.	Clarence Avery	Corvallis	Benton	Oregon.
10.	Clara V. Fisher	Corvallis	Benton	Oregon.
11.	Clara G. Irvine	Corvallis	Benton	Oregon.
12.	Bertha Davis	Corvallis	Benton	Oregon.
13.	Mollie M. Fisher	Corvallis	Benton	Oregon.
14.	Emma Weber	Corvallis	Benton	Oregon.
15.	Emma Kittredge	Monroe	Benton	Oregon.
16.	John D. Denman	Corvallis	Benton	Oregon.
17.	Barney S. Martin	Brownsville	Linn	Oregon.

SECOND YEAR.

	Names of Pupils.	Town.	County.	State or Terr.
1.	L. A. Helm	Corvallis	Benton	Oregon.
2.	Eddy Stock	Corvallis	Benton	Oregon.
3.	John Fulton	Corvallis	Benton	Oregon.
4.	J. H. Starr	Corvallis	Benton	Oregon.
5.	W. D. Risley	Albany	Benton	Oregon.
6.	T. J. Risley	Albany	Benton	Oregon.
7.	Boyd W. Hamilton	Oakville	Linn	Oregon.
8.	U. S. Loughary	Monmouth	Polk	Oregon.
9.	Chester Avery	Corvallis	Benton	Oregon.
10.	C. O. Wells	Corvallis	Benton	Oregon.
11.	O. V. Waggoner	Corvallis	Benton	Oregon.
12.	Ida May Ray	Corvallis	Benton	Oregon.
13.	Hattie Friendly	Corvallis	Benton	Oregon.
14.	May Warren	Corvallis	Benton	Oregon.
15.	Ethel Lewis	Corvallis	Benton	Oregon.
16.	Jessie V. Waggoner	Corvallis	Benton	Oregon.
17.	Lena Mackey	Corvallis	Benton	Oregon.
18.	Anna Allen	Corvallis	Benton	Oregon.
19.	Ida Right	Corvallis	Benton	Oregon.
20.	Ida May Locke	Corvallis	Benton	Oregon.
21.	Annette H. Thompson	Corvallis	Benton	Oregon.

ONE YEAR.

	Names of Pupils.	Residence.		
		Town.	County.	State or Ter.
1.	Charles L. Johnson	Corvallis	Benton	Oregon.
2.	William R. Hull	Corvallis	Benton	Oregon.
3.	Joseph Alexander	Corvallis	Benton	Oregon.
4.	Percival Nash	Corvallis	Benton	Oregon.
5.	Geo. L. Paul	Corvallis	Benton	Oregon.
6.	Frank Hilly	Corvallis	Benton	Oregon.
7.	Harry H. Samuels	Corvallis	Benton	Oregon.
8.	Caleb A. Davis	Corvallis	Benton	Oregon.
9.	D. H. Woodward	Corvallis	Benton	Oregon.
10.	Ora D. Davidson	Buena Vista	Polk	Oregon.
11.	Milton M. Wilkins	Corvallis	Benton	Oregon
12.	Seth Hurlburt	Corvallis	Benton	Oregon.
13.	Arthur Spaulding	Buena Vista	Polk	Oregon.
14.	Chester Mason	Corvallis	Benton	Oregon.
15	C. Henderson	Dufur	Wasco	Oregon.
16.	Clara Duncan	Summit	Benton	Oregon.
17.	Sarah Harris	Corvallis	Benton	Oregon.
18.	Minnie Waggoner	Corvallis	Benton	Oregon.
19.	Nettie Ground	Wells Station	Benton	Oregon.
20.	Helen Holgate	Corvallis	Benton	Oregon.
21	Grace G. Jenks	Corvallis	Benton	Oregon.
22.	Ann Lewis	Corvallis	Benton	Oregon.
23.	Rose Horton	Corvallis	Benton	Oregon.
24.	Fanny Hurlburt	Corvallis	Benton	Oregon.

PREPARATORY DEPARTMENT.

1.	John A. Fisher	Corvallis	Benton	Oregon
2.	Geo. Weber	Corvallis	Benton	Oregon
3.	Lucius O. Hull	Corvallis	Benton	Oregon
4.	Chesley P. Clark	Corvallis	Benton	Oregon
5.	Milton A. Wyatt	Corvallis	Benton	Oregon
6.	Marion Needham	Tangent	Linn	Oregon
7.	Clarence Henkle	Corvallis	Benton	Oregon
8.	Rowland K. Chambers	Corvallis	Benton	Oregon
9.	Frank Mitchell	Bonanza	Klamath	Oregon
10.	Grant Williamson	Albany	Benton	Oregon
11.	Scott Gharrett	Missoula	Missoula	Montana Ter.
12.	C. M. Miller	Gervais	Marion	Oregon
13.	Frank Rowland	Corvallis	Benton	Oregon
14.	Charles O. Rice	C rawfordsville	Linn	Oregon
15.	Richard W. Scott	Milwaukee	Clackamas	Oregon
16.	Henry Buckhouse	Missoula	Missoula	Montana Ter.
17.	Addie May Bristow	Corvallis	Benton	Oregon
18.	Nellie Hogue	Corvallis	Benton	Oregon
19.	Ollie Irene Thompson	Corvallis	Benton	Oregon
20.	Georgia Milner	Corvallis	Benton	Oregon
21.	Ina Rice	C rawfordsville	Linn	Oregon
22.	Ann Martyn	Corvallis	Benton	Oregon
23.	Bertha C. Spangler	Corvallis	Benton	Oregon
24.	Nellie Davidson	Buena Vista	Polk	Oregon
25.	James William Spangler	Corvallis	Benton	Oregon
26.	Elmer H. Smith	Corvallis	Benton	Oregon
27.	Althea A. Leach	Lexington	Morrow	Oregon
28.	Paul Henderson	Dufur	Wasco	Oregon
29.	C. C. Wilson	Wells Station	Benton	Oregon

TABLE OF CLASS-ROOM WORK.

FIRST TERM—SESSION 1888-89.

	No. of Students in Class.	Time Taught Each Week.	Class.	Subject.	Subjects from Curriculum Omitted or Postponed, on Account of Students Being Overcrowded With Work.
Professor Arnold	26	10 hours	Second year	Rhetoric and Logic	First year, none.
	16	4 hours	Third year	Constitutional Law	Second year, none.
	13	5 hours	Third year	Political Economy	Third year, none.
Total	45	19 hours			
Professor Grimm					First year, none.
	8	3 hours	Third year	Agriculture	Second year, Tillage and Drainage.
					Third year, none.
Professor Letcher	25	10 hours	First year	Algebra	First year, none.
	13	5 hours	Second year	Geometry	Second year, Meteorology.
	16	5 hours	Third year	Mechanics and Surveying	Third year, none.
	60	2½ hours	All	Drill and Tactics	
Total	114	22½ hours			
Professor Berchtold	25	5 hours	First year	English Grammar	
	17	2½ hours	First year	German	
	10	2½ hours	First year	Latin	First year, History.
	4	2½ hours	Second year	German	Second year, none.
	3	2½ hours	Second year	Latin	Third year, none.
	3	2½ hours	Second year	French	
	50	2 hours	All	Vocal music	
Total	112	19½ hours			

TABLE OF CLASS-ROOM WORK.—CONTINUED.

FIRST TERM—SESSION 1888-89.

	No. of Students in Class.	Time Taught Each Week.	Class.	Subject.	Subjects from Curriculum Omitted or Postponed on Account of Students Being Overcrowded With Work.
Professor Hull	25	5 hours	First year	Physiology, Reading and F. H. Drawing	First year, Geography.
	16	5 hours	Second year	Physiology, Elocution and F. H. Drawing	Second year, Mechanical Drawing.
	16	5 hours	Third year	Physiology, Elocution and F. H. Drawing	Third year, Farming and Commercial Law.
Total	57	15 hours			
Professor Lake	16	3 hours	Third year	Horticulture	First year, Botany.
	7	5 hours	Prep. dep't	Arithmetic	Second year, Farm Plants.
	8	5 hours	Second year	Botany	Third year, none.
Total	31	13 hours			
Professor Irish					First year, Elementary Chemistry.
	9	4 hours	Second year	Chemistry	Second year, Geology and Mineralogy.
	12	3 hours	2d and 3d year	Physics	Third year, Geology and Laboratory Work.
Total	21	7 hours			
Professor Bristow				Geography	
	29	25 hours	Prep. dep't	Arithmetic	First year, none.
				English Grammar	Second year, Commercial Book-keeping.
				Reading	Third year, Farm Book-keeping.
				Elementary Algebra	

THE INSTITUTE WORK.

It is proposed to make this a popular feature of the college work. For this reason it is planned to hold four institutes—one at each of the following places: Corvallis, Salem, Roseburg and Hillsboro. The one at Corvallis was held on November 15 and 16. The subjects presented were as follows: "Ensilage," Wallis Nash; "Dairy Interests," Thos. Paulsen; "County Fairs," Geo. Armstrong; "Native Grasses," M. Wilkins; "Drainage," Edgar Grimm. There were several other subjects on the programme, but as the persons having them were absent, the consideration of them was left for some future time. The attendance at this first institute was very small. In large part this was due to a failure of the committee to thoroughly advertise. There were, however, enough present to make lively discussions on several of the topics presented. The next one, to be held at Salem, will, it is confidently expected, have a much larger attendance, as it has been well advertised and as several of the prominent men of that section will address the meetings. The manner of getting up the institute is very simple. The only problem of any consequence that confronts us is money for printing, stationery and traveling expenses. We write, or better, visit some leading men at the place of holding the institute, get their help about place of meeting, speakers, etc., and then work out a programme with the material, filling in vacant places, etc., with members of the faculty of the college. In the future we expect this institute work to be largely carried on by the farmers themselves. We also expect the institute to be a medium for the interchange of ideas and information between the farmers and their college. In the East as many as an hundred institutes are held in a season in one State, and those with less than half the natural advantages of our own State. A few hundred dollars spent in such work would be of inestimable value to the farmers.

INSTRUCTION IN AGRICULTURE.

AGRICULTURAL COLLEGE,
CORVALLIS, Dec. 19, 1888.

President B. L. Arnold:

I have had the third year students in agriculture this term for one hour each day. Whole number in class, seven.

E. GRIMM.

PEPORT OF P. H. IRISH.

Professor of chemistry and physics, for fall term, 1888, O. A. C.:

Chemistry.—Number of students, 9. Number of hours in class per week, at first five, later three. Total number of recitations, fifty-four. Total number of absences, eighteen. Average per cent. of absences, 3.7.

Physic.—Number of students, twelve. Number of hours in class per week, at first five, later two. Total number of recitations, forty-six. Total number of absences, thirty-two. Average per cent. of absences, 5.8.

THE HORTICULTURAL DEPARTMENT.

AGRICULTURAL COLLEGE,
CORVALLIS, OREGON, December 18, 1888.

Mr. President:

The work in the horticultural department for this term has been very crude. To begin, I was not here to attend to such work until the close of the third week, and when I did arrive it was very difficult to start, as a new programme had to be made, and that, along with the delay and confusion consequent on changing in mid-term, brought me to nearly the close of the fourth week before work began. I then commenced to lecture on horticulture before the third-year students—a class of sixteen; ten gentlemen, six ladies. After giving such lectures for about two and one-half weeks, it was found necessary to again change the programme, this time to lessen the work of the third-year students, who were carrying six and seven recitations each day. Professor Grimm and myself agreed to alternate our work. At the time of this change I introduced for a text-book "Quinn's Money in the Garden." From that time the students have recited to me every alternate day on an assigned lesson in the above text-book. They have passed over the subject matter and have done fairly well considering the former preparation for such work and the *very* limited means for illustration at our disposal. The second-year students began the study of systematic botany about the same time that the others began work. In a few days we found it impracticable to continue this work on account of lack of material for work and the general unfitness of the students to handle systematic botany, some of them having never taken elementary botany. The class was turned over to Prof.

Berchtold, who gave them language every day instead of alternate days. About the middle of the term I took charge of an arithmetic class from Prof. Bristow's department.

The work on the grounds, in connection with station work, has taken most of my time. In the planning and execution of such work it is necessary to be on the "scene of action" almost constantly. This has been impossible in the past from the arrangement of class work. In the future it is hoped that we may avoid any clashing in this direction and thus avoid much confusion.

The second-year male students were required to work on the lawns and garden one hour each day. We would like to make this work solely educational, but at present it is impracticable. Our boys fell into line and did as good work out-doors as in the classroom.

Respectfully submitted,
E. B. LAKE.

THE PREPARATORY DEPARTMENT.

AGRICULTURAL COLLEGE,
CORVALLIS, OREGON, December 21, 1888.

Mr. President:

Twenty male and nine female students have been enrolled in the preparatory department of the State agricultural college during the first term of the session of 1888-9. These were organized into six classes for daily recitations, as follows:

Geography.—This class includes nine male and seven female pupils. They draw maps and recite, principally, by the topic method.

Arithmetic.—There were seven young men presented themselves for admission to the department who did not possess the requisite qualifications to enter my percentage class. I brought the matter before the faculty, and it was thought best not to send any away for the first year, at least. These persons were therefore formed into a more elementary class, and Prof. Lake kindly consented to hear them recite. The regular class, known as the "percentage class," includes twenty-two pupils, thirteen male and nine female.

Grammar.—This class is composed of seventeen males and seven females.

Reading.—The entire department has had daily exercises in reading, spelling, analysis of words, punctuation and kindred subjects.

Algebra.—At the suggestion and request of the president, I organized a class of twenty in elementary algebra. They are doing good work.

The work of the department has been quite satisfactory, indeed, and I am pleased to say that a general determination is manifested to put forth still greater efforts for the coming terms.

Needs.—It will be impossible for me to do the work assigned me in college course without some more assistance in this department.

Most respectfully submitted,
W. W. BRISTOW,
Principal Preparatory Department.

MATHEMATICS AND ENGINEERING.

AGRICULTURAL COLLEGE,
CORVALLIS, OREGON, Dec. 21, 1888.

Professor B. L. Arnold:

I herewith submit my report of the mathematical and engineering department for the first term of session, 1888-89. The senior or third-year class (16 members) have recited the third hour of each day—surveying on Tuesdays and Thursdays, mechanics on Wednesdays, Fridays and Mondays—and have completed 141 pages of Carhart's Surveying and 103 pages of Woods' Mechanics.

Recognizing the classes need of field work in surveying, and they being able to meet me at no other time, I have each Saturday morning from 9 to 12 o'clock met and instructed such students as desired this practice. The fact that one-half of the class have never attended this necessary branch of instruction in surveying demonstrates conclusively the necessity of making their attendance thereat obligatory instead of optional, as at present, and I should be pleased to have the regents' attention called to this matter.

The intermediate or second-year class (13 members) have recited the first hour of each day on geometry and have completed 210 pages of Wentworth's Plane and Solid Geometry.

The freshman or first-year class (25 members) have, for the purpose of better instruction, been divided into two sections, which recite the fifth and sixth hours of each day and have completed 150 pages of Wentworth's Algebra.

It gives me pleasure to call attention to the zeal and interest shown by the students in their mathematics and the satisfactory progress they have made. The engineering department has been supplied with a compass, plane table, level, rods, chain, tapes, etc., but still needs a light mountain transit with solar attachment, which will cost about $300.

Very respectfully yours,
JOHN D. LETCHER,
Professor Mathematics and Engineering.

THE MILITARY DEPARTMENT.

Agricultural College,
Corvallis, Oregon, Dec. 21, 1888.

Professor B. L. Arnold:

I herewith submit my report of the military department for th first term of the session 1888-89: All the male students, about sixty in number, have been drilled one-half hour each day and have completed squad drill and are now being drilled in "the school of th company." On account of having no guns we have been compelle to omit all instruction and practice in the manual of arms.

As all the students were raw recruits I have had to exercise great deal of care and patience with them and to consume muc more time than would ordinarily be required. In instructing an drilling the senior class before placing them in charge of the othe students, I am, however, glad to notice the progress made and th improvement in their carriage and bearing.

This department should be furnished at the earliest practica moment with 150 cadet rifles, 45 calibre, and the necessary side-arm consisting of swords, bayonets, belts, cartridge boxes, etc., etc., an a room in the college building should be fitted up as an armory. plot of ground of sufficient size should be leveled and drained for parade ground.

Very respectfully yours,
JOHN D. LETCHER,
Professor in Charge of Military Department.

MILITARY, ENGINEERING AND MATHEMATICS.

Agricultural College,
Corvallis, December 14, 1888.

President Arnold:

First term, session 1888–89. Senior class, 16 members, recit one hour every day. Second-year class, 13 members, recites o our every day. First-year, first and second sections, 25 members, ecites one hour every day. Male students, about 60, drill one-half our every day. Total time engaged in recitations, four and one-alf hours every day. The time employed in surveying on Saturays has averaged *about one-half hour per school day for the entire rm.*

JOHN D. LETCHER,

Prof. Mathematics and Engineering, and Prof. in Charge Military epartment.

REPORT OF W. N. HULL.

FALL TERM, 1888.

AGRICULTURAL COLLEGE,
CORVALLIS, December 19, 1888.

on. Board of Regents:

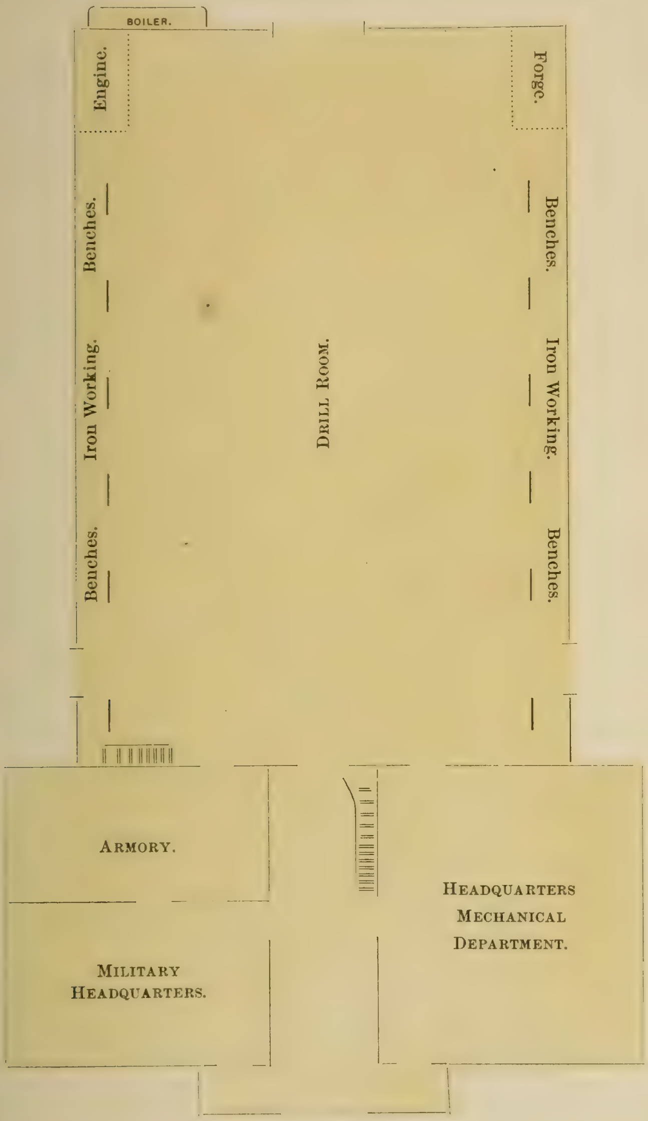
First Year. Physiology, two lessons per week; free-hand drawng, two lessons per week; reading, one lesson per week. Second ear, physiology, two lessons one week, three the next week; free-and drawing, two lessons one week, three the next week; elocution, wo lessons one week, three the next week. Third year. Physiology, ne lecture weekly; drawing, two lessons per week; elocution, two essons per week; several lessons in short-hand writing.

I desire for my department one skeleton, $50; two Yaggy's anaomical charts.

Respectfully,

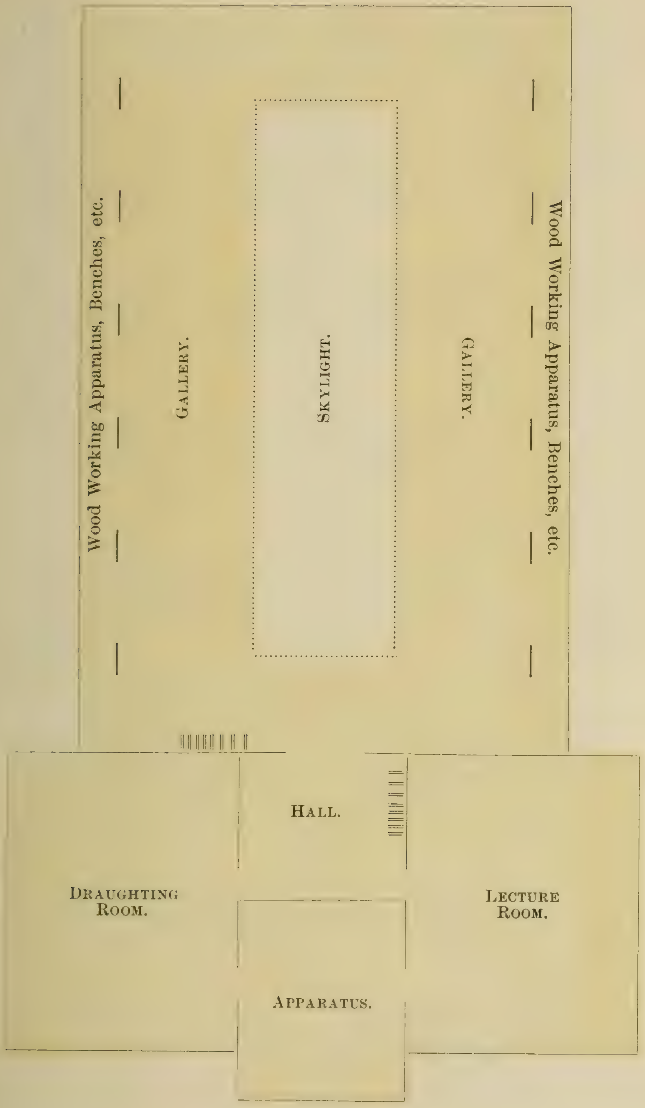
W. N. HULL.

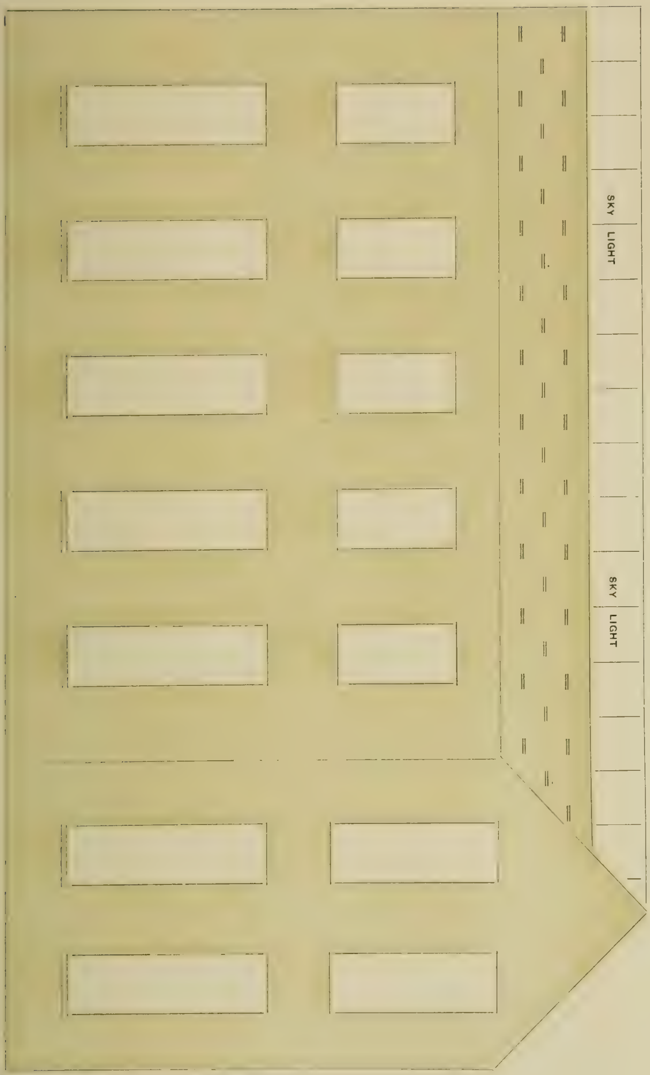
A ROUGH PLAN OF MECHANICAL BUILDING, ARMORY, DRILL HALL AND OFFICES COMBINED.



GROUND PLAN.

Cost of Building and Apparatus, about $8,000.
Size Main building, 30x60 feet; Drill Room, 48x72 feet.


Wood Working Apparatus, Benches, etc.
Gallery.
Skylight.
Gallery.
Wood Working Apparatus, Benches, etc.
Hall.
Draughting Room.
Lecture Room.
Apparatus.


SKY LIGHT
SKY LIGHT

ANNUAL REPORT

OF THE

President of the Board of Regents

OF THE

STATE AGRICULTURAL COLLEGE

TO THE

GOVERNOR OF OREGON

FOR THE YEAR ENDING JUNE 30, 1890.

LEGISLATIVE ASSEMBLY, SIXTEENTH REGULAR SESSION.

1891.

PUBLISHED BY AUTHORITY.

SALEM, OREGON:
FRANK C. BAKER, STATE PRINTER.
1891.

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STATE AGRICULTURAL COLLEGE

TO THE

GOVERNOR OF OREGON

FOR THE YEAR ENDING JUNE 30, 1890.

LEGISLATIVE ASSEMBLY, SIXTEENTH REGULAR SESSION.

1891.

PUBLISHED BY AUTHORITY.

1857

SALEM, OREGON:
FRANK C. BAKER, STATE PRINTER,
1891.

REPORT.

To His Excellency Sylvester Pennoyer, Governor of Oregon:

SIR: I have the honor of forwarding to you the following report from the president of the board of regents of the State agricultural college of Oregon.

Very respectfully,

WALLIS NASH,
Secretary.

CORVALLIS, December 31, 1890.

THE STATE AGRICULTURAL COLLEGE.

To His Excellency Sylvester Pennoyer, Governor of Oregon:

SIR: The State agricultural college of Oregon recognizes three great objects:

First—Education of young men and women in the several subjects ordered by the act of congress of 1862, namely, agriculture and the mechanic arts, not forgetting the other usual branches of a liberal education.

Second—The carrying out of the intentions of congress in establishing the experiment station, as a department of the college, and by means of the special appropriation of $15,000 annually, under the Hatch act, approved March 2, 1887.

Third—The extension of knowledge of improved methods of agriculture and its allied sciences, and of horticulture and its various branches, among all persons interested by means of bulletins, published quarterly from the experiment station, and by farmers' institutes held under the auspices and direction of the college in various sections of the State.

This report falls naturally, therefore, under these three heads. Dealing then, first, with the State agricultural college as a teaching institution in agriculture and the mechanic arts, and the usual branches of a liberal education, I must preface my description of the college as it is to-day with a short sketch of its history.

The board of regents appointed during the February session of the legislature of 1885 did not assume the control and government of the college until July 2, 1888, when the new building erected by the citizens of Benton county was formally accepted by you, sir, as Governor of Oregon. Therefore, only two years, from July, 1888, to June 30, 1890, cover the whole history of the college under State control—a short time, measured by months and weeks, but perhaps long enough to enable judgment to be passed on the plans formed by the State board of regents and the measures taken by them to carry such plans into effect.

The task assumed by the State board was no light one.

The Methodist Episcopal Church South had, first, assumed by official acts recognized by the legislature of Oregon and adopted by the act of February, 1885, to relinquish to the State the control and management of the agricultural college, and had then, by means of a suit in equity against the individual members of the State board of regents, tried to nullify their acts and resume control.

All parties, save and except the representatives of the Methodist Episcopal Church South, accepted in good faith the acts of the legislature of Oregon, approved as above mentioned February 11, 1885, and confirmed by a second act approved November 21, 1885. The citizens of Benton county, aided by a few outside friends, proceeded to complete the subscription and payment of sums aggregating about $25,000, and the sums so raised were expended by the building association, with the advice and approbation of the State board of education, as provided in the act of February, 1885, in the erection and equipment of the new college building on the farm designated by the legislative act as the college farm, near Corvallis.

In this new building—most admirably adapted to accommodate for teaching purposes upwards of 150 students—the agricultural college of Oregon, at last controlled and governed by the State of Oregon, through the board appointed by the State, opened its session on September 12, 1888, with an attendance of about 40 students; closing that year, however, with 91 on the rolls.

Much preparatory work had been accomplished by the board of regents, who had met at regular intervals from the time of their first appointment. The scheme of studies had been framed by a special committee of the board, of which Hon. Geo. W. McBride, Secretary of State, and Hon. E. B. McElroy, Superintendent of Public Instruction, were the most active members, and was only adopted after a most careful scrutiny and long consideration by the full board. Prior to this plans and methods of nearly all the agricultural colleges in the United States had been thoroughly analyzed and compared, and the course of study and management of the Oregon college is based on the results so laboriously obtained. The aim sought to be attained was thorough technical education in "Agriculture and the Mechanic Arts," as laid down in the original act of congress. To make this plan effective a first-rate staff o teachers was necessary, imbued with a united and harmoniou spirit of interest in their work for the work's sake, and a determination that the agricultural college of Oregon should be second t none in the quality of the teaching and the educational influenc on the youth of Oregon there taught.

No appointments have been made without long and carefu inquiry into the character and attainments of the applicants. Suc appointments are, by necessity of the case, experiments, and it cannot be wondered at that in a staff of a dozen men the board have considered it to be for the best interests of the institution as a whole that certain changes of men and modifications in subjects taught should be made in the course of the first two years of the new college? Another requisite for the usefulness of the school was that the charges must be low enough to enable the farmers' and mechanics' sons and daughters to attend without too heavy a drain on the parental purse, or better still, the cost must be set at a figure not too high to be covered by the savings of that most worthy class of students who prize the college opportunities enough to earn and lay by hardly-earned money to get there. For this end the students must be lodged and boarded by the college, advantage being also taken of the produce of the farm, garden, and orchard of the college to reduce the cost of living to the lowest point. But there were no buildings suitable for these purposes. The liberality of the legislature of Oregon was appealed to, and at the session of 1889 they responded by including in the appropriation in favor of the State agricultural college then passed an amount which served, with the strictest economy, to build and furnish a student's hall for the reception of about 55. Very few then thought that by the end of 1890 accommodations for 150 students would have to be provided. But to make the teaching of agriculture and horticulture effective on a working scale, and at the same time to provide suitable scope for the experimental work called for by the Hatch experiment station act, much more farming land was necessary than was furnished by the 35-acre farm referred to in the act of 1885, and which farm had been purchased by public subscription of the citizens of Benton county tor the benefit and purposes of the State agricultural college many years ago.

For this purpose also the legislature of 1889 was urged to make an appropriation. They met these requirements also by providing the funds by which about 155 acres of farming land, in proximity to the 35-acre farm and the college buildings, were purchased for $14,215.40 in the summer of 1889, and a handsome octagonal barn was built on the newly-purchased farm and fitted up with feeding stalls, silo, root house and storage room for hay and grain. These provisions also have now proved inadequate for the increased production of the farm. Technical teachings in the mechanic arts demands a building for carrying on working in wood and metal, some machines, of such simple kinds as are in common use, and a good supply of carpenters' and smiths' tools and implements. Funds for these purposes were also found out of the $30,000 appropriated by by the legislature of 1889; a convenient two-storied workshop, with draughting room and recitation room attached, was built of brick and partially supplied with machinery and tools—sufficient, at any rate, for the instruction in wood-working of a considerable number of students. The expenditure under this head has been about $7,441. The Oregon State agricultural college receives both male and female students. The scheme of instruction adopted by the board included, for the special benefit of female students, classes in household economy and hygiene. If the boys were to be practically taught how to lay out, manage and work a farm, garden, or orchard, the girls must be taught the household duties of the higher social life. To cook, to make and repair the family garments, to care for the preservation of individual and of family health, to tend the sick, to study how to beautify and adorn the home—all these duties lie within this most useful department. Even after the resolutions to establish this chair in the college had been taken it was a long while before the regents could satisfy themselves as to making the appointment. Finally Miss Margaret C. Snell, M. D., of Boston, lately of the Snell academy, Oakland, was appointed, and the board have since seen reason to congratulate themselves, and above all, the lady students of the college, on the selection so made. A visit to the class-room, filled with class after class of girls at work from early morning until the college day closes, will amply repay any one interested in the higher technical education of women today.

Facilities have also been provided for the practical study of horticulture, the importance of which, especially to Western and Southern Oregon, the board can hardly overrate. A forcing house 25 feet by 16 was first built, with potting shed and work room attached, and last year a green-house 39 feet by 20 was added Illustration of the work done in these houses was given in the exhibi of ornamental plants and flowers, which drew so much admiratio at the State fair at Salem. All the florists' work of propagating budding, layering, potting and forcing of flowers and ornamenta plants is practically taught to the students of both sexes, under highly-qualified gardener, who is now the horticulturist to colleg and station. Special attention is given to the successful growing fruits large and small, and of vegetables. The old college far provided one orchard of neglected fruit trees, which in the state i which it came under the care of the board, presented an extrem example of what an orchard ought not to be, but afforded a admirable opportunity for practicing methods of extermination codlin moths and all other Oregon enemies of the orchardist. Th farm afterwards bought with State money had on it also a large ol orchard in poor condition. These orchards have been proper cared for, except as to such of the trees as were left to show visib the result of neglect, or were in the hands of the professor of entomology for his use in showing the methods and results of insecticides, and of apparatus of all sorts used in the warfare against injurious and destructive insects. Another orchard of about 10 acres is about to be planted out in the neighborhood of the new barn the coming fall and winter. All the work of the fruit grower in grafting, layering, budding, in arching and propagating fruit trees, is thoroughly and practically taught in the revised course of study now in operation. The importance to the student of thorough botanical knowledge is recognized by the board, and a professor of botany now devotes all his time and attention to the teaching of botany in the college, and the botanical researches included in the station work. Attention was called in the report for 1889 of the president of the college to the pressing need of an entomologist. The board of regents were fully alive to this, but the funds at their disposal did not admit of the organization of this branch of work and the appointment of a professor until the beginning of the session of 1889-90. The appointment then made of Professor F. L. Washburn, B. A., (Harvard) has proved highly successful, and the work of this department is continually growing in interest and importance.

The act of congress under which the college was established recognized, as above stated, that the teaching of agriculture and the mechanic arts should not exclude proper teaching in the English language and literature and other branches of a liberal education. While the practical, technical matters, to which reference has already been made, are given as the primary objects in the course of studies at this college, yet thorough training in English grammar and literature, and in mathematics and its allied sciences, is insisted on. One of the features which distinguishes the course here from that at any other college or university in the State is, that one hour's practical labor is made compulsory daily on every male student. The nature of this labor varies with the season of the year, with the stage of the college course of any one student, and with the nature of the college course itself, whether agricultural, mechanical, or scientific. Besides this one hour of compulsory labor, a certain amount of money is allowed for student labor in the agricultural and horticultural departments, to be distributed among such students as earn it by voluntary labor, at the rate of 15 cents per hour. The time tables, to be found on page — of this report, will show the number of hours of class-room college work done by each professor in the college years 1889 and 1890; and the same tables will indicate, also, the time left for the station work of those professors who are members of the experiment station force.

The chairman of the executive committee was enabled to report to the board in March, 1885, that 104 students were in attendance—a gratifying increase on the forty-three of September, 1888. At this time upwards of 185 students are on the rolls, and an attendance of 200 is fully expected after the reöpening of the college from the Christmas vacation.

It is pleasant to note two changes in the composition of the classes: First, the area from which the students come is growing wider all the time, and the students at this time, as a whole, are older, more mature, and have been better taught previous to their entrance in the college.

In a list of agricultural colleges of the United States for 1889 (kindly furnished by the courtesy of Hon. A. W. Harris, acting director of experiment stations, Washington, D. C.,) Oregon stood sixth from the foot of the list in number of students. If Oregon had been represented in that list by her present number of students her place would have been thirteenth from the foot—a considerable change inside of two years. It is believed that the agricultural college of Oregon has at this time more students in proportion to the population of the State than any strictly agricultural college in the Union.

A comparison between the number of teachers and the students in the several classes in the Oregon college, with similar figures gathered from the catalogues of a number of the leading colleges, places Oregon in the front in this respect.

The attendance of students is not likely to fall off now that the opportunities for usefulness are increased by the passage of the new Morrill act, approved August 30, 1890. This act places $15,000 at the disposal of the regents for the year ending July, 1890, and a sum of $16,000 for the current year 1890–91, with annual increases of $1,000 until the limit of $25,000 is reached. The first $15,000 will be chiefly devoted to increasing and improving the equipment of the college, subsequent appropriations to the current annual expenses. This course has been suggested by the association of American colleges and is being generally followed.

But as the present attendance of students has outgrown the present buildings, both for teaching, experimental and lodging purposes, the regents are at a loss to know how any increased numbers can be accommodated. Congress only attaches one condition to its munificent grant, which is that no part of it shall be spent on buildings—such expense the several States must bear.

Therefore the legislature of Oregon must be appealed to, however reluctant the board of regents, and you, sir, as Governor, may be to appear before our law-makers to urge them to again give monies to this college which they generously favored in 1889. But there is no alternative. The pressing needs of this institution are $10,000 to build an experiment station laboratory. In this new building the chemical, botanical, agricultural, horticultural and zoölogical and entomological laboratories must be placed, in order to give the college building the rooms at present occupied for these purposes; and also to give the station workers the benefit of the larger space and greater conveniences imperatively needed. And there must be a building constructed to accommodate not less than 150 male students. This will absorb not less than $15,000. And the board are also most anxious to build and to begin at once to operate the dairy, which was proposed in 1889, but the erection of which had to be left over for want of funds.

The board of regents used every effort to economize in the outlay of the $30,000 appropriated in 1889. They reduced the size of the buildings below what they desired to put up; they let the erection of the students' hall, mechanical hall and barn to the lowest responsible bidders; they engage to follow the same course respecting the outlay of all further funds with which they are entrusted, but the welfare of the State demands certain expenditures now in order that this growing and most useful institution may fulfill its beneficent purpose.

And, after all, it is not an unreasonable request, growing, as it does, from the successful working and development of the trust committed to the regents by the State in 1885. The usefulness to the people of Oregon of what has already been done is, surely, the best of all claims to be entrusted with still larger responsibilities. The figures of the expenditure, both of the appropriations and on current account for the college, are shown on the treasurer's account appended.

As to the experiment station, the report regarding its operation and its financial condition is a separate document, to which attention is respectfully called.

It remains to notice that the series of farmers' institutes organized by the board in many parts of the State during the past two years, and carried out by the institute's committee under the board's direction, have all proved attractive in a growing degree, and it is believed have been found of great benefit to the farming community.

Commencing with Corvallis, the series of 1889-90 comprised meetings at Ashland, Albany, Oregon City, Eugene City, Pendleton and Independence, and the series of 1890-91 at Grant's Pass, Union, McMinnville, The Dalles and Junction City—one at Silverton remains to be held. In all cases there was a cordial invitation to come again, and a promise in that event of still larger attendance and greater efforts to make the meetings interesting.

APPENDIX I.

The following is a statement of the average amount of work done by each professor during the session 1889-90, estimated in hours or lessons of fifty minutes each.

Name of Professor.	Chair.	No. of hours a week spent in class work
B. L. Arnold, A. M	President and English	25
E. Grimm, B. S	Agriculture	10
J. D. Letcher, C. E	Mathematics	25
F. Berchtold, A. M	Languages	27½
W. N. Hull, A. M	Elocution and drawing	10½
E. R. Lake, M. S	Botany and horticulture	7
P. H. Irish, Ph. D., and assistant	Chemistry	6
W. W. Bristow, A. B	Preparatory department	25
F. L. Washburn, A. M	Zoölogy and entomology	7
G. A. Covell, M. S	Mechanical engineering	25
Margaret P. Snell, M. D	Household economy and hygiene	25
W. A. Lampkin, B. S	Assistant to Prof. Bristow	10

June 18, 1890. Very respectfully,

B. L. ARNOLD.

APPENDIX II.

GENERAL CONDITION.

Tabulated statement of students in departments, etc.

Total number	152
Number of male students	105
Number of female students	47

CLASSIFIED BY DEPARTMENTS.

College	81
Preparatory	71
Total	152

CLASSIFIED BY YEARS.

First year	55
Second year	14
Third year	6
Fourth year	0
Post-graduates	6
Total	61

CLASSIFIED BY COURSES.

Agricultural	24
Scientific	17
Mechanical	12
Domestic economy	18
Literary	4
Post-graduate	6
Total	81

CLASSIFIED BY STATES.

Oregon	129
Washington	2
Montana	1
Total	132

CLASSIFIED BY COUNTIES.

Baker	2
Benton	88
Clackamas	7
Columbia	6
Douglas	1
Jackson	1
Klamath	1
Lane	4
Linn	4
Marion	5
Polk	10
Union	5
Umatilla	1
Wasco	3
Yamhill	5
Total	143

CLASSIFIED BY APPOINTMENTS.

Benton	5
Baker	2
Columbia	3
Clackamas	4
Douglas	1
Jackson	1
Klamath	1
Lane	4
Lake	1
Linn	2
Marion	7
Polk	7
Union	4
Umatilla	1
Wasco	2
Yamhill	5
Total	50

TREASURER'S REPORT.

CORVALLIS, Or., June 24, 1890.

To the Board of Regents of the State Agricultural College:

GENTLEMEN:—I beg leave to submit the following statement as treasurer of the State agricultural college of receipts by me during the past year, both on college income account, the Hatch experiment station fund and the purchase or capital appropriations made by the legislature of Oregon.

The accompanying distributive statements of disbursements have been made out in a shape to secure an easy comparison with the outlay of the previous year. These documents taken together will constitute my treasurer's report for the year now closing.

All books, papers and documents are herewith submitted for examination.

I desire to state that Mr. H. R. Clark, your clerk, has experienced much difficulty during the past year in making up and segregating the various amounts and accounts. He is now familiar with the system we use, and will be able during the coming year to present monthly statements of receipts and outgoings. I have found him diligent and attentive.

Very respectfully,
(Signed) T. E. CAUTHORN,
Treasurer.

EXPENDITURES ON IMPROVEMENT FUND

Under legislative appropriation of $30,000 under act approved February 18, 1889.

Purchase of land		$14,215 40
Mechanical hall	$5,829 92	
Tools and machinery	1,611 95—	7,441 87
Engine and boiler		934 87
Well, water tank, pump and pipe		1,520 26
Students hall and dormitory		5,301 20
Furnishing the same		1,277 40
Barn	1,843 50	
Woodshed	470 00	
Cow barn and sheds	175 00	
Boiler house	128 00	
Work in barn, silo, granary, fixing scales, etc	176 30—	$ 2,792 80
		$33,483 80
Credit by appropriation		30,000 00
Balance due Treasurer		$ 3,483 80

Distribution.		Total figures for 1889-1890.	Amount appropriated for 1889-1890.	Actual expenditures July, 11, '89, June, 24, '90.
College advertising and printing 1889-90	$306 26	$ 487 44	$ 500 00	$ 822 26
Station B, 1889-90	516 00			
Care of grounds	$ 511 95	1,504 81	400 00	1,779 23
Labor transferred from station account	1,171 46	1,182 52	----------	
Station labor, care of grounds	95 28			
Current expense, fuel, etc		451 03	----------	657 61
Furniture and outfit: 1-5 of $1,993 16	$398 63	----------	----------	456 91
1-5 of 291 41	58 28			
Freight, expressage and drayage		182 61	200 00	158 77
Insurance		150 00	200 00	360 66
Postage, stationery and telegrams		78 43	75 00	84 61
Repairs and betterments		498 29	500 00	828 33
Traveling expenses		427 75	800 00	619 31
Live stock		282 00	600 00	595 00
Salaries (see list of annual amount)		12,059 05	14,050 00	----------
Paid to June 24, balance from 1888-89	$2,064 40	----------	----------	11,241 22
Paid on account 1889-90	9,176 82			
Balance due June 24, 1890, and since paid	6,053 18			
Household economy		----------	----------	374 23
Library		----------	----------	7 05
Miscellaneous		207 37	557 00	322 85
Sanitary expenses		----------	----------	241 90
Outfit of professors' rooms		----------	----------	327 44
Mechanical		127 70	----------	----------
Balance from 1888-89		----------	269 48	269 48
		$ 19,632 16	$ 18,550 11	$ 19,146 86
Deduct balance of salary account 1889-90, paid 1889-90		----------	----------	2,064 40
				$ 17,082 46
Add bal. of salaries 1889-90, due July 1, 1890, subsequently paid		----------	----------	6,053 18
				$ 23,135 64
Total receipts as per attached list		----------	----------	19,835 83
Balance due treasurer		----------	----------	$ *3,299 81

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*Of this bolance due treasurer of $3,299 81, $1,500 is represented by the receipt of $9,000 only from the State Treasurer on agricultural college fund interest account, instead of $10,500 estimated receipts.

RECEIPTS BETWEEN JULY 1, 1889, AND JUNE 24, 1890.

Date.	From what source.		College income account.	Station account.
1889				
Oct. 7	Interest		$ 1,000 00	-----------
7	Appropriation		1,666 67	-----------
11	Tuition		705 00	-----------
21	Uniforms		58 10	-----------
21	Expenses (traveling) returned		24 70	-----------
23	Uniform		5 40	-----------
Dec. 6	Appropriation		833 33	-----------
1890				
Jan. 4	Interest fund		2,500 00	-----------
4	Tuition		175 00	-----------
Feb. 15	Sale of team		225 00	-----------
Mar. 10	Sale of vegetables		10 20	-----------
10	Appropriation		1,666 67	-----------
10	Appropriation		833 34	-----------
10	Interest fund		2,500 00	-----------
Apr. 15	Tuition		80 00	-----------
18	Repayment from station fund		1,632 52	-----------
May 14	Credit on over payment		8 90	-----------
June 21	Sale of pipe and pot		10 00	-----------
20	Tuition		200 00	-----------
14	Overpaid J. C. Applewhite		36 00	-----------
			$ 15,170 83	
	Due June 24, and since paid—			
26	Tuition	$ 165 00	$ 4,665 00	-----------
July 2	Appropriation	1,666 67		
2	Appropriation	833 33		
	Interest	2,000 00		
			$ 19,835 83	
	From U. S. government		-----------	$ 15,000 00

SALARY LIST 1889–1890.

COLLEGE.

President B. L. Arnold, A. M	$ 1,600 00
J. D. Letcher, C. E., Professor of Mathematics and Engineering, and of Military Science and Tactics	1,600 00
E. Grimm, B. S., Professor of Agriculture	500 00
E. R. Lake, M. S., Professor of Botany and Horticulture	600 00
P. Herbert Irish, Ph. D., Professor of Chemistry	600 00
G. A. Covell, M. S., Professor of Mechanics and Mechanical Engineering	1,600 00
F. L. Washburn, B. A., Professor of Zoölogy and Entomology	600 00
Margaret Snell, M. D., Professor of Household Economy and Hygiene	1,000 00
F. Berchtold, A. M., Professor of Modern Languages	1,600 00
W. N. Hull, A. M., Professor of Common Law, Physiology and Mechanical Drawing	1,600 00
W. W. Bristow, A. B., Principal Preparatory Department and Professor of Book-keeping	1,600 00
George Coote, Foreman in Horticulture	450 00
Robert Irwin, Janitor	480 00
H. R. Clark, Clerk and Steward	400 00
T. E. Cauthorn, Treasurer	500 00
Wallis Nash, Secretary	500 00
	$15,230 00

EXPERIMENT STATION.

E. Grimm, Agriculturist and Director	$ 1,500 00
E. R. Lake, Botanist and Horticulturist	1,000 00
P. H. Irish, Chemist	1,000 00
F. L. Washburn, Entomologist	600 00
H. T. French, Superintendent of Farm	900 00
George Coote, Foreman in Horticulture	450 00
H. R. Clark, Clerk	600 00
Robert Irwin, Janitor	300 00
President B. L. Arnold, President of Council	400 00
W. D. Bigelow, Assistant Chemist	1,000 00
	$ 7,750 00

ACCOUNTANT'S REPORT OF FEES COLLECTED.

To the Board of Regents of the State Agricultural College of Oregon:

GENTLEMEN:—Following is the report of my work as accountant for the session 1889–90:

Amount of tuition fee, term I	$322 50
Amount of tuition fee, term II	355 00
Amount of tuition fee, term III	217 50
Total amount for session	$895 00

Very respectfully,
(Signed) F. BERCHTOLD.

REPORT OF SPECIAL COMMITTEE OF BOARD OF REGENTS ON TREASURER'S ACCOUNTS.

CORVALLIS, Oregon, June 25, 1890.

MR. PRESIDENT:—Your committee, to whom was referred the annual report of Hon. T. E. Cauthorn, treasurer of the board, beg leave to submit that we have examined the said report and accompanying books, and find that the books are neatly and properly kept, and that the accounts of the treasurer, as shown by this report, are correct.

(Signed) W. P. KEADY,
(Signed) J. T. APPERSON,
(Signed) A. R. SHIPLEY.

OREGON EXPERIMENT STATION.

REPORT.

CORVALLIS, Or., December 31, 1890.

To His Excellency Sylvester Pennoyer, Governor of Oregon:

SIR: In accordance with section 5 of the act of congress, usually called "The Hatch Experiment Station Act," we have the honor of submitting to you a report of the operations of the Oregon experiment station for the year commencing July 1, 1889, and also a report of the receipts and expenditures on station account during the financial year expiring June 30, 1890.

Very respectfully,

WALLIS NASH,
Secretary of the Board of Regents.

AGRICULTURAL EXPERIMENT STATION FUND.

Report of special committee of the board of regents at the annual board meeting, held at Corvallis, Oregon, on June 25, 1890.

To His Excellency Sylvester Pennoyer, Governor of Oregon:

SIR: We, the special committee of the board of regents of the State agricultural college, to whom was referred the duty of examining and reporting on the account of the treasurer of the State agricultural college, who is also treasurer of the Hatch experiment station, beg to report as follows:

We have considered the summary of expenditures and receipts furnished us by the treasurer, Hon. T. E. Cauthorn, a copy of which is hereto attached, and we have examined the treasurer's books and the vouchers submitted by him.

We find the books well kept and correspond with the vouchers produced, and we report that the summary so attached hereto correctly shows the receipts and payments of the said treasurer of and relating to the Hatch experiment station fund, between the 1st day of July, 1889, and this 25th day of June, 1890.

Very respectfully,
(Signed) W. P. KEADY,
(Signed) J. T. APPERSON,
(Signed) A. R. SHIPLEY.
CORVALLIS, Or., June 25, 1890.

I hereby certify that the following is a true copy of the summary of receipts and payments referred to in the above report.
(Signed) T. E. CAUTHORN,
Treasurer.

I hereby certify that the above signature is that of the treasurer of the State agricultural college of Oregon.
(Signed) WALLIS NASH,
Secretary.

DISTRIBUTION OF EXPENDITURES, 1889–90.

Distribution.	July 1, 1889, to June 15, 1890, 11½ months.	Expenditure in last 15 days in June, estimated or actual.	Total one year.
Chemical apparatus and supplies	$ 814 12	$ 42 15	$ 856 27
Freights, expressage and drayage	245 23		245 23
Fencing and drains	321 36	11 57	332 93
Greenhouse and potting shed	650 00		650 00
General fittings	241 18		241 18
Incidental expenses	438 86		438 86
Library	613 65		613 65
Labor	2,096 42		2,096 42
Postage, stationery and telegrams	87 70		87 70
Printing and advertising	146 85		146 85
Salaries	4,792 50	2,640 74	7,433 24
Supplies	865 60		865 60
Scientific instruments	300 20	3 00	303 20
Tools and machinery	431 71	257 16	688 87
Total	$ 12,045 38	$ 2,954 62	$ 15,000 00

NOTE.—The extra labor in this department, amounting to $1,013.02, has been transferred to college account.

STATEMENT OF DISBURSEMENTS, JULY 1, 1889, TO JUNE 30, 1890.

For what.		Eleven and one-half months.	Fifteen days, estimated and ascertained.	Total.
AGRICULTURE—				
Books		$ 237 45	----------	$ 237 45
Fencing and drainage		321 36	$ 11 57	332 93
Instruments, etc		13 50	----------	13 50
Seeds and plants		182 26	----------	182 26
Tools and machinery		185 31	98 35	283 66
Labor		1,957 75	403 21	2,360 96
Food for stock		268 79	93 84	362 63
Miscellaneous		199 31	26 22	225 53
Salaries—				
Agriculturist and director	$1,500 00			
Superintendent of farm	900 00	1,725 00	600 00	2,325 00
		$5,090 73	$1,233 19	$ 6,323 92
Deduction by transfer of excess labor to college account				1,013 02
				$ 5,310 90
HORTICULTURE AND BOTANY—				
Greenhouse		$ 650 00	----------	$ 650 00
Seeds and plants		120 88	----------	120 88
Books (but including part payment for team)		376 20	----------	376 20
Tools and machinery		246 40	----------	246 40
Scientific instruments		167 32	----------	167 32
Miscellaneous (but including part payment for team)		336 97	$ 10 85	347 82
Labor		658 48	90 00	748 48
Salaries—				
Botanist	$1,000 00			
Foreman	450 00	1,342 50	107 50	1,450 00
		$3,898 75	$ 208 35	$ 4,107 10
CHEMISTRY—				
Laboratory and fittings		$ 255 63	15 00	270 63
Apparatus and supplies		814 12	42 15	856 27
Miscellaneous		196 87	13 80	210 67
Salaries—				
Chemist, per annum	$1,000 00			
Assistant, per annum	1,000 00	1,375 00	500 00	1,875 00
		$2,641 62	$ 570 95	$ 3,212 57
ZOÖLOGY AND ENTOMOLOGY—				
Scientific instruments		$ 119 38	----------	$ 119 38
Fitting rooms, apparatus, etc		407 45	$ 21 86	429 31
Salaries—				
Entomologist	$ 600 00	350 00	150 00	500 00
		$ 876 83	$ 171 86	$ 1,048 69

STATE AGRICULTURAL COLLEGE OF OREGON.

BOARD OF REGENTS.

W. S. Ladd, president, Portland.

T. E. Cauthorn, treasurer and chairman executive committee, Corvallis.

Wallis Nash, secretary, Corvallis.

Governor Sylvester Pennoyer, Salem (*ex-officio*).

Secretary of State Geo. W. McBride, Salem (*ex-officio*.)

Superintendent of Public Instruction E. B. McElroy, Salem (*ex-officio*).

Master of State Grange H. E. Hayes, Oswego.

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J. W. Grim, Aurora.

W. P. Keady, Portland.

A. R. Shipley, Oswego.

J. K. Weatherford, Albany.

REGULATIONS

Governing that Department of the State Agricultural College of Oregon which is known as the Oregon Agricultural Experiment Station.

Adopted by the Board June 25, 1889.

1. The board of regents has executive control of the station, is responsible for its expenditures; apportions the income among the several departments of the station; elects the members of the working force; orders and directs, in general terms, the nature of the scientific work to be undertaken by the working force, in its various departments, and assumes, from time to time, such other duties as may appear to the board to be involved in, or arise from, any of the foregoing items, including the establishment of branch stations in various parts of the State.

2. A station council is hereby created, consisting at first of the president of the college, the director of the station, and the agriculturist, botanist and chemist of the station force. Changes or additions may be made by the board of regents from time to time as fresh departments are added to the station force, or reärrangements effected therein.

The president of the college is *ex-officio* the president of the station council, with the powers and functions in carrying on the business of the council usually attached to the office of president. He is the official representative of the station council in its relations with the board of regents.

THE FUNCTIONS AND DUTIES OF THE COUNCIL

Are—*a*. To prepare plans of scientific work and to submit same to the board of regents, with financial estimates for carrying the same out.

b. When such plans shall have been approved by the board of regents, to apportion the same among the members of the working force, and submit to the board periodical reports of the progress of the same.

c. To prepare and submit to the board quarterly the drafts of the bulletins which are by law demanded from the experiment station, and when the same have been printed, to see to the due publication of the same.

d. To promote in all practicable ways farmers' institutes in various parts of the State of Oregon, held under the direction of the State agricultural college.

3. The director of the station shall maintain a general and daily oversight of the various departments, and report the condition of the work to the station council.

He shall examine and certify all requisitions for purchase demanded, and all vouchers for payments needing to be made by the departments. He shall cause to be kept, and shall be responsible for the accuracy of all station labor accounts. He shall have charge of the station correspondence, except in cases where the council may apportion such correspondence among other members.

4. Each member of the station force shall be independent in, and responsible for, the work of his own department, receiving and carrying out the general instructions from the station council, and furnishing such periodical reports of the progress of work as he may from time to time be requested to supply. When supplies or outfit are needed, the particulars shall be shown on a written requisition, signed by the head of the department, and by him handed to the director. All accounts or invoices for such supplies or outfit shall be procured by the head of the department in question, and, if correct, shall be so certified by him and handed to the director.

WALLIS NASH,
Secretary.

CORVALLIS, June 25, 1889.

FOR THE YEAR ENDING JUNE 30, 1890.

STATION FORCE.

B. L. Arnold, A. M., ex-officio President.
E. Grimm, B. S., Director and Agriculturist.
E. R. Lake, M. S., Botanist and Horticulturist.
P. Herbert Irish, Ph. D., Chemist.
F. L. Washburn, A. B., Entomologist.
W. D. Bigelow, M. S., Assistant Chemist.
H. T. French, M. S., Superintendent of Farm.
George Cook, Foreman in Horticulture.

Report of the Operations of the Agricultural Experiment Station in Connection with the State Agricultural College of Oregon During the Year Ending June 30, 1890.

During the year now under review considerable progress has been made in several lines of experimental work, the general outlines of which were referred to in the report of the previous year. Popular attention has been drawn to one important feature of these experiments by the exhibition at the State fair in Salem in September, 1890, and at the Mechanics' fair in Portland in October, 1890, of a collection of 425 distinct varieties of potatoes grown on the college farm under generally similar conditions of land and culture.

The comparative results of these experiments, carefully tabulated, will appear in a forthcoming bulletin; and thus one great advantage of the Oregon experiment station to the farmers of the State will have been fully secured and demonstrated. The first results on 79 varieties of potatoes so treated and grown appeared in station bulletin No. 4 of January, 1890, to which attention is afresh directed.

The tests of grasses and clovers on the college farm, which were begun as the first experimental work undertaken when the station was established, have been carried further during the past year, and 125 plats have been set out for purposes of test and comparison. The product of each plat was weighed in the green state and as hay, and these results will soon be published in station bulletins. The almost uniform success in growing these grasses and clovers on soil which is in general terms white land, and was in poor condition, seems to demonstrate, if proof were needed, that the Willamette valley is especially adapted to these systems of mixed farming in which the clovers and tame grasses take a large and profitable part. Similar comparative experiments on 90 varieties of wheat, 16 of oats and 37 of corn have been made. Specimens of many of the products were exhibited at Salem and Portland and excited much attention. Many other products of the farm, such as sugar beets, mangel wurzel, carrots, beans, vetches, etc., have also been or are in process of being grown and tested.

There are now on the college farm good examples of four breeds of cattle—Jerseys, Polled Angus, Durham, and Hereford—of which two Jerseys, a herd-book bull and cow, were kindly donated by Hon. J. T. Apperson, of Oregon City; a Polled Angus cow by Mr. T. Smith, of Corvallis; a Durham bull calf by Mr. P. K. Waters, of Eugene, and a Hereford cow by Mr. J. Foster, of Benton county. Considering how desirable it is that the comparative values in Oregon of all the distinctive breeds of domestic animals should be ascertained by such means as are at the disposal of the experiment station of the State agricultural college, where facilities are at hand for measuring, weighing, feeding and testing various animals which cannot be expected to be possessed by any ordinary farmer, special attention is here called to the generous gifts above mentioned, not only as a due recognition of the kindness and thoughtfulness of the donors, but in the hope that many who read this report may make up their minds to "go and do likewise."

One point in passing may be allowed. The grading up of the marketable fat cattle of Western Oregon, to say nothing of the vast herds of Eastern and Southern Oregon, would in a very few years produce for market at two and one-half years old, at least the same average weight as now sold by the farmer at three and four years old, with a corresponding increase in weight if the improved graded animals were held until three or four years old. A similar increase of value in wool and mutton would certainly follow the exercise of the same care in breeding and caring for the improved breeds of sheep. One of the functions of the experiment station is to ascertain and publish facts on these and kindred subjects, so that the farmers of Oregon may have, free of charge to them, experience which, without the experiment station, would have to be dearly paid for. The distribution of the funds of the experiment station has not yet permitted the development of these experiments, but it is intended to give special attention to them in the near future.

Another line of experiments is being undertaken this fall which promises to be of great benefit to the farming community. Several fields, of four or more acres in each, will be laid down in grasses in various proportions, and with various quantities of seeds, and the results tabulated to ascertain the best varieties and the most advantageous quanties of seed, under the conditions of the Willamette valley. These fields will be used both for hay and for pastures and the different results ascertained and published.

In the horticultural department the planting out of many different varieties of vegetables, small fruits, fruit trees, forest trees, native and foreign, and ornamental shrubs and flowers, has been continued during the past year. The results, so far as ascertained during the season of 1889, were published in station bulletin No. 4, which was widely distributed among the farmers and fruit growers of the State. The vegetables are tested with the special view of ascertaining the comparative value of the leading varieties for our climate and soil, and also to determine how methods of cultivation affect different varieties. The points to be specially noticed in small fruits are hardiness, productiveness, quality and variability. The improvement of native and cultivated varieties by cross fertilization is also studied.

The collection, planting and propagating of large numbers of the various fruit trees of advantage to Oregon has also been carried on, and in the coming fall and winter another orchard, specially for experimental purposes, will be planted out on the new college farm on ground near the new barn. Many of the forest trees and ornamental trees, shrubs, vines and climbers, which were named in station bulletin No. 4, and which have now completed another season's growth, will also be set out on the farm and grounds during the coming fall.

In this department there are now growing the following number of varieties of fruit:

Apples	92
Blackberry	4
Quinces	3
Gooseberry	6
Strawberry	24
Pears	21
Peaches	48
Grapes	25
Raspberry	5
Nuts	2

In the chemical department considerable work of general interest has been accomplished, or is in progress. Coöperative experiments on the sugar beet are being carried on, having for their object to determine the suitability of various sections of Oregon for sugar production. Many samples of beet, grown under various conditions, have been tested, and their saccharine product ascertained. Future bulletins will present the results of these experiments in such shape as to determine whether the conditions exist in Oregon under which the manufacture of beet-root sugar can be commercially profitable.

Several chemical analyses of ensilage have been made, with the object of determining the amount of substance digested by animals, and also to ascertain the effect of heating by steam on the digestibility of ensilage.

Various analyses of fertilizers have been made, both to determine their correspondence with the guarantees under which they have been sold, and also to develop their use in wheat cultivation.

The white soil of the Willamette valley has been chemically tested, to find out its possibilities of improvement by cultivation and artificial fertilization.

Many analyses of varieties of wheat have been made in order to ascertain the variation caused by climate and soil.

Repeated experiments have been made with plants reputed to be poisonous to stock, but so far the chemical department has not succeeded in killing any of the animals experimented on; on the contrary, they have appeared to thrive under a diet in which "larkspur," in its various stages of growth, or "camas root," or "wild parsnip," or "cow parsnip," formed a considerable item. Since every spring large numbers of cattle do die when first the new growth of wild vegetation makes its appearance. The causes of these losses can be and will be determined; but the results of the experiments so far are purely negative.

Various substances have been sent in to the station chemist from different localities in Oregon to be by him tested. When time has permitted, and when the question appeared to be one of general interest rather than of private profit, it has been the policy of the board to have such examinations made. In this line tests have been made of samples believed to be fire clay and lime rock. Altogether thirty-five analyses have been made, comprising over 500 separate determinations and requiring over 1,000 weighings.

The work of the entomologist and zoölogist to the station is of much public interest. Prof. Washburn has succeeded in inducing belief through an increasing circle of correspondents that their communications will receive prompt attention and intelligent replies. His collections of injurious and of harmless or beneficial insects attracted much attention both at the Salem State fair and at the Portland exposition. The results of the careful experiments of this department, having for object the extermination of the codlin moth, have been published in bulletins Nos. 3 and 5, and the instructions for action on the part of the orchardists there given have been followed with success in many instances, although very much remains to be done before it can be claimed that anything like a fair general trial has been given in any one of the great fruit-growing districts to the plans of spraying and stem and branch cleansing to get rid of this great pest. Experiments with the grain weevil, and with corn worms, currant worms, cut worm and many injurious insects have been and are continuing to be made. Correspondence has also been had with farmers as to damage to land and crops by gophers and ground squirrels and by birds of various kinds. It is hoped that any one who desires information on any of the matters within the range of this department will not hesitate to write or come to the college if within reach. So much as an outline of the work accomplished at the experiment station during the past fiscal year.

The board of regents controlling the Oregon experiment station are glad to see that their views on one important subject entirely agree with those recently expressed by Prof. W. O. Atwater. the United States director of experiment stations at Washington, D. C.

“The expenditure of both college and station funds by the college authorities involves some delicate questions of adjustment. For instance it frequently happens that the same person renders service to and is paid by both institutions, as when an officer of the college shares in the work of the station. Such an arrangement may be advantageous to both college and station and entirely proper, provided the interests of the station call for the work, the person has the time and the qualifications needed, the college pays a due equivalent of salary for the service it receives and the station receiving a due equivalent of service for the salary it pays.”

In organizing the staff of college and station the board of regents, by adopting this principle, were enabled to secure men for the service of both institutions of a more expensive class than the funds of either would have permitted standing alone.

That the station has had its due proportion of service during the year 1889–90, so far as the regulations of the board could secure that end, will be seen from the following tables showing the total salaries paid and the proportion paid by the station and the amount of time of the station force necessarily employed in college recitations during the year in question. Allowance must, of course, be made for time also consumed in preparation for these classes, especially in the chemical department. The balance represents the time at the disposal of the station force as such.

Name and Office.	Total Salary.	Amount Pai by Station.
E. Green, director and agriculturist	$ 2,000 00	$ 1,500 0
H. L. French, superintendent of farm	900 00	900 0
E. R. Lake, botanist and horticulturist	1,600 00	1,000 0
P. H. Irish, chemist	1,600 00	1,000 0
W, D. Bigelow, assistant chemist	1,600 00	1,000 0
F. L. Washburn, zoölogist and entomologist	1,200 00	600 0
George Coote, foreman in horticulture	900 00	450 0

Name.	Office in college work.	Total average time employed in college class-rooms during 1889 and 1890.
E. Grimm	Professor of agriculture	Two hours per day.
H. T. French	Superintendent of farm.	None.
E. R. Lake	Professor of botany and horticulture	One hour per day.
George Coote	Foreman in horticulture	None.
P. H. Irish	Professor of chemistry	One and one-third hours a day.
W. D. Bigelow	Assistant to professor of chemistry	One hour per day, one term.
F. L. Washburn	Professor of zoölogy and entomology	One hour per day.

The recent organization of college and station as a State institution and the disproportion between the amounts available for expenditures, and the wide area, and many developments of work that needed to be covered sufficiently, account for the inability of the station forces to undertake many investigations and experiments which present themselves as of importance to the community and within the lines laid down by congress for the work of experiment stations. The work of the stations would be more conveniently and therefore better done if better facilities could be commanded. For instance, a detached building, designed for the purpose, should be erected for the station work. This is a more urgent necessity from the rapid increase in the number of college students. Four rooms in the college building have been hitherto devoted to the station work or for the use of the station staff, but with nearly 200 students in the college these rooms are now needed for college purposes as class and recitation rooms. This same necessity has been felt, and this action has been taken already in most other States.

Since the United States government supplies the $15,000 for the support of the station on condition that the State should supply the buildings needed for the station work, and since the necessity for the new buildings has arisen from the successful and rapid development of the agricultural college of Oregon it is earnestly hoped that the legislature of Oregon will accede to this appeal, and appropriate not less than $10,000 for the erection and fitting of the station building with chemical, entomological, botanical, horticultural and agricultural laboratories and store rooms.

Reference was made in last year's report to the desire of the board of regents to establish at least two sub-stations at points to be selected in Eastern and Southern Oregon. So far the way has not been clear to do this. The central station has absorbed all the attention and money at the disposal of the board. It was recognized that there was great danger of inefficiency of work and dissipation of funds if distant centers of work were selected and opened up too soon. But though deferred, the opening up of experiment work in Eastern and Southern Oregon is by no means abandoned.

In conclusion the board would point out afresh to the citizens of Oregon how earnest is their wish for the extension of the functions and usefulness of the experiment station. The bulletins to be issued periodically in the now current year will both be more numerous, and larger issues of each one will be published. Correspondence with all parts of the State on questions within the very extended field of the experiment station work is again invited. All letters should be addressed to the agricultural college experiment station, Corvallis, Oregon.

W. S. LADD,
President of the Board.

WALLIS NASH, Secretary.

APPENDIX.

The following is a short synopsis of the ground covered by the bulletins 1 to 7, inclusive, issued by the Oregon experiment station during the first two years of its organization, 1888–9 and 1889–90.

1. October, 1888.—By E. Grimm, director. States the establishment of the station. Reprints the Hatch act appropriating $15,000 annually to the support of experiment stations in each State or Territory. Refers to the enforced delay in getting to work ; states that no time has been lost in making all preparations. States the subjects which will "receive the attention of the station at present are the following: Study of the soils found on the farm and in different parts of the State. This will include a study of their natural conditions; the effect of drainage; of different modes of tillage, etc.; best methods of maintaining and increasing their fertility and the use and value of fertilizers. Additional work is planned in experimentation with different varieties and methods of cultivation of grains, grasses, roots and forage crops; on the sugar beet, with a view to increasing its sugar contents; with different varieties of apples, prunes and peaches, studying the conditions most favorable for their highest development; on old orchards, including cultivation, best methods of protecting from moss; with forest trees and native grasses and clovers. In addition to this our chemist will make a thorouh study of the chemical composition of our grains, from different parts of the State, of fodders and of mineral waters. Thorough investigation of our insect pests and noxious weeds will be made; and of the diseases to which our plants are subject with remedies for the same. As 'climate affects the composition of the soil, limits the various crops and determines the nature of the live stock suited to a given place,' we hope soon to make the study of climate an important part of the work of the station. * * * * It will be seen that certain branches of agriculture, of great importance to our State, are not included in the above plan, such, for example, as the investigation of the relative value of the various

breeds of cattle for the purpose of the dairy or for beef; relative cost of producing milk, butter, cheese, etc., and the most economical method of feeding to secure the best results." These are not included in our scheme of work because it is impossible with our present equipment to do anything of value upon them.

2. January, 1889.—E. R. Lake, botanist and horticulturist. Horticultural: Preparations and notes on proposed work. States that coming to the work late in September, finding scarcely any approaches, and neither land nor material suitable for the season's planting or seeding, it had been impossible to do more than get in readiness for the operations attendant in spring-time. But the mark of preparation had been so nearly completed in some directions that certain experiments could soon be commenced. States preparation of grounds round the college buildings for experiments with lawn grass seeds, mixture of the same and ornamental trees and shrubs. Other portions of the grounds had been underdrained and subsoiled for testing vegetables and small fruits.

Forcing house 24x18 built and equipped and store room, tool room, potting room and general workshop 16x18, with basement, costing $600. Seed testing had been commenced and results on 12 varieties of beans, 13 of beets. 2 of brocoli, 1 brussels sprouts, 27 of cabbage, 13 of carrots, 7 of cauliflower, 2 of celery, 7 of corn, 9 of cucumber, 13 of lettuce, 12 of onions, 11 of peas, 19 of radish, 5 of rutabaga, 14 of squash, 4 of tobacco, 20 of tomatoes, and 14 of grasses and clovers, were published in this bulletin.

Gave the list of small fruits and of ornamental and root trees which would be planted out in the then coming spring.

3. October, 1889.—E. R. Lake, horticulturist and botanist. Horticultural: Practical work with insecticides, giving details of spraying with London purple and of the results of picking the fruit from sprayed and unsprayed trees.

Entomological. F. L. Washburn, entomologist. Corn worms: Description of insect and remedies for its depredations.

Insecticides. F. L. Washburn. Descriptions; instructions for using; dangers.

Spraying machines. F. L. Washburn. Description; cuts; prices.

P. H. Irish, Ph. D., chemist. Commencement of experiments on poisoning stock with various plants reputed to be poisonous.

4. January, 1890.—E. Grim, agriculturist. Agricultural: Notes on farm crops. States that in February, 1889, after due preparations and drainage, there had been sown 112 plats, of which 67 were grasses, 10 of clover, 7 of forage plants, 13 of wheat and 15 of oats. States that there was but one failure to record of the grass plats, and that (rescue grass) was due to poor soil. And, after a detailed and

interesting description of all the grasses, adds: "It is evident that a more extended study of our grasses is necessary, and it is the intention of the station to make a thorough study of the native and cultivated grasses under such conditions of farm practice as will bring out their true value." Of the clovers all did well and yielded a fair crop. Then refers to the setting out of thirty-one plats on the "white land"—and describes this land--mentions the thorough drainage and preparation of the soil, and describes orchard grass, tall oat grass, tall and field fescues, Italian and perennial rye grass, neluct grass and timothy, as all deserving special mention as doing well on this land, having shown remarkable growth and making a splendid sod. Adds that of the whole number of grasses and clovers only the lerome grasses failed. Then describes the forage crops; teosinte, spurry, seradella, tarweed, ioliason grass, saint-foin or esparsette, spring netches or tares. Then describes the 13 varieties of wheat grown on the station land, with remarks on each; the same as to 15 varieties of oats; then 3 varieties of buckwheat, and 41 of corn. Then follow tabulated notes on 79 kinds of potatoes and 24 of sorghum; and preliminary notes on 14 plats of rutabagas, mangels, carrots and sugar beets.

Horticultural: Notes by E. R. Lake on vegetables were prefaced by the remark that "owing to the extremely dry summer and to the fact that our land was in very poor condition, in consequence of much teaming having been done on it during the previous winter, we were unable to make many valuable notes, even comparative ones. Many of the different varieties were necessarily planted under very unequal conditions, and accordingly fair comparisons can be made with only a few."

Then follow notes on 12 kinds of vegetables. Then follows a list of trees, shrubs and house plants, to be found on the grounds and in the houses, and a list of orchard trees which it was proposed to plant out.

Chemical department: By P. Herbert Irish, chemist; W. D. Bigelow, assistant. Gives results of examination of a clay sent from Alsea as a fire clay; of a rock from Llewellyn, supposed to be a cement rock; of mineral water from Medical Springs, Union county. Then is given the results of the beginning of operations having for their end observations with regard to the effect of climate and soil upon the composition of wheat; 28 samples having been analyzed, calculated to air-dried substance, and separately to substance dried at 100° C. Then follows a description of a new apparatus for use in the determination of fat in plant substances; and then instructions for sampling mineral waters, and also soils for analysis.

5. April, 1890.—Entomology. F. L. Washburn, B. A. Remedies for the devastation of the codlin moth, and instructions for spraying and for "banding" the trees for catching the larvæ; advising the destruction of windfalls, and killing in storehouses, and disinfecting fruit boxes; description of and remedies against the woolly louse of the apple; against green aphis; the pear tree slug; the peach tree borer; the San Jose scale; the flat-headed apple tree borer; the gooseberry fruit worm; the current borer; the flea beetle; the pea weavel; the strawberry crown borer; cut worms; the grain beetle and grain weevil. Then follows some notes on gophers and rabbits.

Department of Chemistry. P. Herbert Irish, chemist; W. D. Bigelow, assistant. Analysis of bone meal in two samples and some observations on fertilizer analysis.

6. July, 1890.—Chemistry. P. H. Irish. Examination of cattle foods; notes on comparative digestibility of cooked and uncooked ensilage; digestion of raw ensilage; analysis of ensilage; composition of dung, calculated to same dried at 100° C.; digestibility of cooked ensilage and similar experiments.

Economic Zoölogy: F. L. Washburn. Giving the inquiries made and answers received as to injurious effects on stock, poultry, grain and fruit of foxes, skunks, minks, weasels, badgers, raccoons, squirrels, gophers, mice, moles, muskrats, bats; also as to birds; 1, imported Chinese pheasants; 2, woodpeckers; 3, owls; 4, hawks; 5, blackbirds; 6, king bird or bee martin; 7, shrikes; 8, Carolina doves; 9, pigeons; 10, quail; 11, grouse.

7. October, 1890.—Horticulture: George Coote, horticulturist. Notes on hardiness, quality, ripening in fruit, dates of maturity and marketing of small fruits, and some vegetables up to date, with outlines of further experiments and testing intended to be carried out.

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~~OREGON~~
~~COLLECTION~~

ANNUAL REPORT

OF THE

President of the Board of Regents

OF THE

STATE AGRICULTURAL COLLEGE

TO THE

GOVERNOR OF OREGON

FOR THE YEAR ENDING JUNE 30, 1892.

Legislative Assembly, Seventeenth Regular Session,

1893.

PUBLISHED BY AUTHORITY.

1859.

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SALEM, OREGON:
FRANK C. BAKER, STATE PRINTER.
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REPORT.

To His Excellency, Sylvester Pennoyer, Governor of Oregon:—

Sir: I have the honor to forward to you the following report from the President of the Board of Regents of the State Agricultural College of Oregon.

Very respectfully,
WALLIS NASH,
Secretary.

Corvallis, January 4, 1893.

THE STATE AGRICULTURAL COLLEGE.

To His Excellency, Sylvester Pennoyer, Governor of Oregon:—

SIR: It becomes once more my duty, as President of the Board of Regents of the State Agricultural College, to present a report of the condition and working of this institution to you as representing the State of Oregon. Two years ago I had a similar duty to perform. In the report then presented, hopes were expressed that time would demonstrate the soundness of the plans of government and control adopted by this Board. The proof was to consist in an increasing number of students, supplied from those special classes of our citizens chiefly interested in agriculture and the mechanic arts, in the visible improvement of the students of both sexes in their studies, deportment, and character, and in the increased influence of the College and Experiment Station on the people of the State.

The report of President Bloss, appended to this report, gives, in the opinion of this Board, satisfactory evidence of the widely extending influence for good now being exerted throughout Oregon by the State Agricultural College. The institution has lost whatever was local and restricted in its roll of students, who are now sent to us from all parts of the State. The bulletins sent out from the Experiment Station at frequent intervals have now a circulation of nearly five thousand copies. The farmers' institutes under the direction of the College are welcomed everywhere. The attendance at these pleasant meetings constantly increases, and lively interest is always shown in the papers and debates on the many and diverse topics affecting the farming community.

It is freely admitted that for any institution for the training of our children the students themselves, as they pass out into life, are by far the best and most permanent advertisement of their alma mater. Our College is still too young for this kind of influence to be widely felt. Only in the coming year will the first class of graduates pass from the walls of the College into the wide world who have been trained in the State Agricultural College since it came under the direct control and government of the regents directly chosen by the State. It is a great satisfaction to the Board to believe that the character and good name of the College will be safe in the hands of these young people. I desire to lose no opportunity of impressing on them their responsibility in this regard.

The year 1891 was one of steady growth and development under the Presidency of the late Prof. B. L. Arnold. To the high character and thorough scholarship of this gentleman the College owes much. His rule was just, kind, courteous; his habits those of constant industry and conscientiousness. The extent and depth of his influence over his students were only demonstrated by his unexpected death in January, 1892.

The Board of Regents felt to the full their responsibility in the choice of a successor. They recognized that as is the President, so will be the college which he governs. Not only are high personal character and wide and deep knowledge essential, but the President must be a ruler of men—full of tact, and experienced in the difficult art of government. In the case of the Agricultural College, moreover, special technical knowledge is demanded. The direction of the Experiment Station calls for a man in sympathy with the special needs of the farmers in the transition state marked by the development of the orchard, fruit farm, and general farm, yielding many products from the wide wheat farms and stock ranches of the past decade. The Board took steps to make the impending selection very widely known. Their success was proved by the receipt of nearly forty applications from all parts of the Union. A careful scrutiny reduced the number of selected candidates to five. Still closer examination of the qualifications of the selected candidates was followed by the choice of Professor John M. Bloss, then of the Topeka schools, an educator of long and varied experience, who had filled most important positions for many years both in Indiana and in Kansas, and who brought with him to Oregon both the cordial good wishes and the genuine regrets of all his former associates. The new President took charge of the College and Station in May last, very near the close of the college year.

The Board felt it to be very desirable that the new President should have all the time possible before the opening of the next college year to know and be known in all parts of the State, and to use such methods as he might approve for attracting students to the College. It is right at this point to notice the fact that the Board placed on Professor J. D. Letcher, as the senior professor, the temporary charge of the College in the sudden necessity consequent on Professor Arnold's death. The responsibility was at once assumed by Professor Letcher, although at that time he was suffering from depressing sickness, in which a less conscientious man might have readily found an excuse. The facts of growth and development which will be found to be detailed in President Bloss' report, appear to the Board to justify to the full the selection they made. I desire to emphasize our conviction that not in numbers alone, but rather in the raised tone, character, and attainments of the students, is to be found the proof that the President is the right man in the right place.

The report of the Experimenting Station will show what is being done in that most important direction. The increasing favor and influence of the farmers' institutes under the present management are, I believe, patent to all. It is most gratifying to the State Board of Regents to be able now to record the fact that the Supreme Court of Oregon, in a careful, deliberate, and thoroughly reasoned decision, confirmed the State of Oregon in the possession and unshared and undisputed control of this College and its property and possessions. Although the Board never failed in their conviction that this result would follow surely on the full exposition of the position of the State, it is without doubt a still farther argument in support of the desires of the Board that the Legislature should continue their fostering care and development of this their own College. While it is a matter of great regret to the Board to have to appeal once again for further funds for building and furnishing purposes, yet the argument now comes with added force that it is the undoubted growth and development of the institution which demands it. To appeals for a stationary or retrograding school, a Legislature might turn a deaf ear. For this College, only now entering on a full career of usefulness to the State, and fed and maintained with yearly increasing funds by the munificence of the General Government, it seems to me that it would be hard to refuse any moderate and well considered amount needed for new buildings in which to utilize, for the benefit of the State, the Government appropriations. The full details of the sum which this Board desires to expend for the benefit and extension of the College, are found in the report of President Bloss on the last page thereof. To these details I desire to call special and favorable attention.

One thing is sure: It is impossible for any institution to remain stationary. To endeavor to stand still is to retrograde. That is the exact condition of the State Agricultural College to-day. Its rooms are full to overflowing. The work-shops of the mechanical department cannot give room, nor does the present equipment in tools suffice for even the students we now have. There is not room in its chemical, zoölogical, and botanical laboratories for the student-work there on which their improvement depends, under the intelligent and modern method applied to them to-day. The horticultural department is without even any lecture or teaching-room at all, and badly needs other facilities. The agricultural department now overflows the barn and shed-room it has, and is unable, without further funds, to tile-drain and otherwise develop the farm, which is to be the best of object lessons to the farmers of Oregon as well as to the students. The department of photography is put away in a slip of a room, without the possibility of a skylight by means of which to print. The number of students has overgrown the desk and table-room which was thought adequate two years ago. The chief increase in numbers is in the College classes proper, not in the preparatory department, which comes into comparison with the public schools. Even if the preparatory department were cut off altogether, the application for building and furnishing funds would still have to be presented. But, this same preparatory department serves to open the doors of the College to some of the most eager and struggling students.

The reports of the special committees on accounts are presented with this report, as well as the summaries of accounts and expenses of both College and Station. Even at the risk of repetition, it must again be stated that the receipts both from the land grant and from the General Government are annual receipts, to be used only in payment of professors' salaries and other current annual outgoings. Not one cent of that money can be used for buildings or other permanent improvements, however urgent the necessity. The Government asks of the State that she should provide the buildings and other permanent means and appliances wherewith to utilize, for the benefit of the State, the teaching and experimenting force provided by the Government. The only exception is that five per cent of the Station Fund received annually from the Government may be used on buildings, etc., for station purposes. With this account of the wide and most useful future now open before this College and Station, the Board must leave the matter to the wisdom and liberality of the Legislature of Oregon.

Respectfully submitted,

W. S. LADD,
President of the Board of Regents.

Corvallis, January 4, 1893.

Corvallis, Oregon, December 31, 1892.

Hon. William S. Ladd, President of the Board of Regents, State Agricultural College:—

My Dear Sir: I herewith transmit to you, and through you to the Board of Regents, the following report on the purposes and needs of the State Agricultural College, together with statistics showing its enrollment for the past two years. The report also contains a summary of the work of this station for the time mentioned, and is placed over the signatures of the several professors and instructors.

PURPOSES OF THE SCHOOL.

The State Agricultural College of Oregon has been organized under the National law for the establishment of such schools. It includes within its curriculm all those brances of study and lines of discipline contemplated in that Act. The following is a brief outline of its purposes and a statement of what has been done to carry out these purposes.

Neither the State nor the Nation can afford to establish and to sustain a system of education which does not have for its basal thought the making of better citizens of those who come directly under its influences. Better citizenship does not depend wholly, nor even primarily, upon intellectual culture, because loyalty to both the State and the Nation, loyalty to duty, honesty of purpose, unflinching fidelity, personal purity, and willingness to submit to legal restraints, are each elements essential to the perpetuity of the State and the Nation. Hence an effort has been made in this institution to cultivate, by direct instruction in ethics, all the nobler traits of mind and heart, as well as to surround the student as far as possible by all those influences which lead to higher ideals of duty and respect of self.

It has been the purpose of the Faculty and the President of this institution to combine ethical teaching with the instruction in all the branches taught. Hence it is believed that every reasonable effort is being made to prepare the youth of this institution for better citizenship, thus justifying the State and Nation in their beneficence.

The intellectual culture contemplated in this College does not vary in quality from that obtained in other educational institutions in the State, nor should it.

Education involves information, yet it is not information. Education awakens the faculties of the mind to energetic action, but this is not education; it is only a means. Education involves the training of the faculties of the mind, and the rendering of these intellectual faculties submissive to the control of the will. It is the result of all these processes of training that terminates in education. Such training may be secured while pursuing the work laid out in the curriculm of the Agricultural College, as well as in the private college, the normal school, or the university.

By the law of its organization the Agricultural College has a special field of work assigned to it—a field which is covered only in the minor details by the work of any other State or private institution. When organized to fulfill its highest mission, it is a polytechnic school, where the scientific principles underlying the great business industries—agriculture, mechanic arts, and household economy—are taught in conjunction with military discipline and military science. Agriculture is here used in its broadest sense, and embraces all appertaining to the art of good husbandry, including horticulture, veterinary science, and all that relates to the proper rearing of animals and plants and their preservation from disease. Mechanical industries include all the forms of work in wood and metals, as well as the manufacture of machinery for the application or transmission of power. This is a broad field, and a proper investigation of these subjects as sciences and as arts, makes it necessary to study thoroughly several other branches of learning. The study of English must be pursued; first, that the constructive imagination of the student may be cultivated; second, that he may be able to comprehend the literature of the subjects studied; and, third, that he may be enabled to express accurately and intelligently the results of his researches, and thus become a valued member of society. For these reasons the study of English and training in the art of expressing thought has been made obligatory upon all students. An understanding of the science of agriculture includes a knowledge of the proper preparation of soils for the reception of a crop. Hence the student must understand how to secure the best mechanical condition of the soil, not only how to cause the immediate disintegration of the tough and baked clayey soils by direct physical means, but he should understand how tile-drainage renders such soils permanently friable. The latter involves a knowledge of engineering and a study of the philosophy of tile-drainage and irrigation as well. To insure the best returns from the farm, the chemical properties of the soil must be known, as well as the chemical constituents of its products. To improve the impoverished soil, a knowledge of the needed fertilizer must be known. To feed stock successfully, the chemistry of food plants must be ascertained, and properly adapted to their needs. Thus if ten bushels of wheat contain only enough lime to make the shells of five dozen eggs, it alone would be an unprofitable food for poultry. If one hundred pounds of clover hay has more lime in it than one hundred bushels of wheat, it might be used as a valuable food where lime is needed. Hence agriculture necessarily involves a thorough knowledge of inorganic and organic chemistry. For this reason, the course in chemistry has been extended, and the pupils are required to do a large amount of work in the chemical laboratory. In this respect our plant, although limited in room, is made to accomodate about thirty students. Agriculture also involves a knowledge of the breeds of stock, as well as the means of securing the most rapid growth and the prevention of disease. Hence a knowledge of comparative anatomy and veterinary science is essential. But food plants are liable to be injured or destroyed by disease, or they may become the prey of insects. Hence the agriculturist and the horticulturist must have a knowledge of entomology and insecticides. Here again opens up a wide field for the investigation of the true scientist and agriculturist. The microscope and a knowledge of microscopy now become essential. This field is one which is ever widening with the growth of science, and is as yet comparatively untouched. Observers are needed upon every farm in order to overcome the ravages committed upon the growing crops. Every student of agriculture and household economy is required to study entomology in the laboratory, in order that a thorough acquaintance with the known pests to agriculture and horticulture may be acquired.

Our laboratories in chemistry, physics, and along biölogical lines are small, not giving sufficient room for the students now engaged; they are, while the best in the Northwest, incomplete as compared with that of the best institutions. The rapid growth of the school shows that more room and a larger and more complete equipment is needed to meet the demands of our work. Laboratory work is essential to the successful study of all subjects, and it is the only method which can inspire the student to become a real investigator. Upon the number of educated investigators is dependent the rapid development and the material prosperity of the State. Horticulture, when studied from a scientific point of view, is not only ennobling to the mind, but is a subject of greatest profit to the State. With this subject, as with certain fields in agriculture, the science of botany is intimately related, and becomes in its proper study an important factor. The study of plant life, methods of growth, the means and the manner of decay, the plan of cell formation, the philosophy of circulation, the methods of repair, the processes of fertilization, are all inspiring subjects to the earnest student, and open up to him broad fields rich in thought. The philosophy of budding, grafting, transplanting, and methods of propogation have a high educative as well as esthetic value. The laboratory process is carried on in the study of this subject; hence all the pupils who study agriculture and household economy are required to learn the art of budding, grafting, methods of pruning, and caring for flowers, for testing the values of vegetable products and modes of culture. Here, as will be found in other departments, we have reached the limits of our quarters. There is not room for the proper instruction and work in our ever-growing classes.

The mechanical department covers a wide range of work and investigation. Here is laid the foundation upon which the work of the artist and the artisan and of those who conduct the great business industries must rest. This training consists of a college course of four years, and includes a thorough and more extended knowledge in physics and in mathematics than the other courses. Here is brought into use the students' knowledge of freehand drawing. Here their knowledge of physics and calculus is applied in studying the machine and the laws producing motor powers. Here mechanical drawing is taught and applied in preparing the drawings from which work in wood and metal is fashioned. In this course, not only the study of the philosophy underlying mechanics is mastered, but the student is required to spend one hour each day at work in the shops. The first year is devoted to work in wood, in which the use of all the tools used in carpentry is brought into requisition, and all the forms of work in framing and carpentry are reproduced from blue prints of drawings which the pupils have been required to construct. The second year is devoted to work in the blacksmith shop. Here every form into which iron is wrought and every process with which the skilled smith must be acquainted, is repeated. The testing of all such work as to exactness of size and accuracy of form has as much educational value as the correct solution of a problem in algebra or geometry. The third year is devoted to vise and machine work. The fourth year is devoted to the manufacture of tools and to the higher forms of work in the machine-shop. Some useful machinery, including a fifteen-light dynamo, is now under construction by this class. When the student has completed this course of instruction, if he devotes his attention to farming, he is prepared, with the outlay of about forty dollars, to repair and to keep in order the machinery of the farm. He learns how to care for and to manage machinery. This to-day is one of the most important problems to every farmer, and is no less useful than a knowledge of the science of agriculture. Especially is this true as to the value of the services of the farm laborer. In the mechanical department is laid the foundation for the thorough mastery of all great mechanical industries. Here are educated men who may readily become skilled in any of the great mechanical pursuits. Here are prepared men not only to be artisans, but to become managers of great business industries. They do not simply learn a trade as an apprentice, but they learn the philosophy of what they do as it never was taught to the apprentice in the most palmy days of apprenticeship. It is well known that the days of apprenticeship are past. Two things stand in its way: First, labor unions practically control the employment of apprentices by limiting the number; second, by the division of labor in all the great manufacturing industries, there is no necessity nor desire to teach all the parts of any great industry; it is more remunerative to the manager to hold the laborer to that kind of work which he can perform with the greatest skill. Hence the study of mechanical industries is essential to the State.

The department of household economy and hygiene is an important factor in our college work. Here the young women spend an hour each day in studying the art and philosophy of household economics. Sewing, millinery, dressmaking and fitting, and the chemistry of cooking, are among the subjects practically taught: while social etiquette and the laws of hygiene and the care of the sick are not neglected. The training in this department is exceedingly valuable, because neatness and correctness are required in all its steps. To the State, no more important work can be done than to cultivate those habits which should prevail in every household. Economic habits, cultured taste, and nobility of character are the elements which go far to make and to keep the home happy. The happy home is the prosperous home. Upon such homes rest the perpetuity of the Republic.

Two other departments have been added since the last report was made to the Legislature; photography and photo-gravure, and printing. In each, much interest has been manifested, and the classes are larger than our acommodations warrant. Photography is important to the student for its educational value in applying his knowledge of chemistry and physics, while for its esthetic culture it is invaluable. Photography is no longer to be regarded as a secret art, nor is a knowledge which is so valuable, and a means which adds so much to human happiness and pleasure, to be overlooked in a course of study. Aside from its educational value, it is almost a necessity in the scientific work of the station.

Many young men are practically unfitted, by nature or by accident, for work either on the farm or in the mechanical pursuits. For this class it was believed that printing would be a valuable line of work. It has not been restricted to that class, however. Young men and young women both have been admitted to this class of work. This is not only valuable as a trade, but it has within it a great educative value. The training in spelling, composition, punctuation, and in all the other lines of English is exceedingly valuable. The first class in printing was organized this year, and its progress has been very commendable.

LABORATORY PROCESSES.

That we learn to do by doing has become an axiom in educational literature. In the Agricultural College, practically, all the work is tested by the laboratory process. In physics, chemistry, mechanics, drawing (freehand and mechanical), botany, zoölogy, physiology, surveying and engineering, English, household economy, and in all the agricultural and mechanical, and horticultural processes this method is fully carried out.

The military discipline required in the Agricultural College is of high educational value; in this, that it requires prompt and instantaneous obedience, and perfect attention to the work in hand. The physical training is of great value, because it brings into play all the muscles, and the drill requires such positions of body as establish those habits not only graceful in themselves but most healthful to the student.

Last year this work was in the hands of Capt. C. H. Warrens, of the United States Army, retired. On his resignation, a detail was asked for from the Secretary of War. It was learned from him that in all coast States such details were to be made by the Secretary of the Navy. Our request was not granted by the Secretary of the Navy, on account of the need of all the naval officers then in the service. An officer will be placed in charge of this department as soon as he can be secured.

REQUIRED LABOR.

In this institution, which is in one sense an industrial school, each student is required to devote one hour each day to labor. The kind of labor depends upon the course which the student is pursuing. If he is in the agricultural course, then it includes all the kinds of labor which is done upon the farm or garden, thus putting into practice that which has been taught in the classes. He is required to make surveys for tile drainage as well as to take lessons in laying the tile; he sows the seed, notes the growth and development of the plant, and the fruitage; he is taught to graft, to bud, and to cultivate the tree or plant properly, as well as to prune and train it; and during the winter term he learns the art of carpentry and blacksmithing. If he is in the mechanical course, he learns the art and the philosophy of making all the forms of work in wood and metal, as was indicated above. If the student is pursuing the course in household economy, she is taught the art and science of sewing, dressmaking and fitting, canning, preserving and cooking. In addition to this, she is required to do work in household gardening, including grafting, budding, and flora-culture. If printing be the industry, then type-setting, proof-reading, press-work, etc., constitutes the labor.

Thus it will be seen that the work required of the student is along the line and in pursuance of the course which he has undertaken. The reasons for requiring work are the following:—

First—Because it is the best means of testing the work of the classroom.

Second—Because of the educative value which comes from enforced accuracy and neatness.

Third—Because the knowledge thus gained enables the student to acquire any trade or vocation readily when he leaves the school.

Fourth—Because it stimulates within the student self-reliance and a respect for physical labor. The student who looks upon physical labor as beneath his dignity, or who would show disrespect for the laborer because he is a laborer, is wholly unfitted for training in this institution.

Fifth—Because physical labor, and the practical knowledge of how to perform it, inspires the student with higher ideals of life and best fits him on graduation to compete with skilled labor.

Sixth—Because it enables him to become a more useful member of society.

STATISTICS.

The following tables of statistics show the enrollment of the school during the year 1891-2, and the first term of 1892-3.

	No. enrolled for the year 1891-2.	*No. enrolled for the first term 1892-3.*
Number of males enrolled	130	161
Number of females enrolled	78	94
Total enrolled	208	255
Classified by departments:—		
College department	122	181
Preparatory department	86	74
Totals	208	255
Classified by years of work:—		
Preparatory department	86	74
First year	63	121
Second year	28	36
Third year	19	14
Fourth year	9	8
Post-graduates	3	2
Totals	208	255
Classified by courses of study:—		
Preparatory department, agricultural and household economy	86	74
Agricultural course	29	39
Mechanical course	33	69
Household economy	48	66
Literary course	6	--------
Scientific course	3	5
Post-graduate course	3	2
Totals	208	255

The following table shows the number of students who under the Legislative enactment of 1885 have taken advantage of free scholarships therein provided, and also the number of free scholarships to which each county is entitled:

County.	*Free scholarship students in 1891 and 1892.*	*Free scholarship students now enrolled.*	*No. of free scholarships to be appointed by the county court*
*Baker	3	3	2
Benton	4	4	4
*Clackamas	5	5	5
Clatsop	1	----	4
*Columbia	2	3	2
**Coos	2	4	2
††Crook	----	----	2
*Curry	----	----	1
Douglas	5	5	5
*Gilliam	3	2	2
**Grant	----	----	1
**Harney	1	----	1
Jackson	1	1	5
*Josephine	----	----	2
**Klamath	2	3	1
**Lake	----	----	1
Lane	5	3	6
Linn	6	6	6
*Malheur	----	----	2
*Marion	7	7	8
*Morrow	2	2	2
Multnomah	2	5	15
Polk	4	3	4
**††Sherman	1	1	1
*†Tillamook	1	1	1
*Umatilla	----	1	5
**Union	4	5	3
*Wallowa	----	----	2
**††Wasco	1	2	1
*Washington	1	2	5
†Yamhill	1	5	4
Total	63	74	105

NOTE.—The number of free scholarships to be appointed by Joint Senators or Representatives is 16, making the whole number of free scholarships 121.

The * preceding the name of the county indicates that another may be appointed by Joint Senator.

The † preceding the name of the county indicates that another may be appointed by the Joint Representative.

NEEDS OF THE STATE AGRICULTURAL COLLEGE.

An institution of learning, like any other undertaking, if successful, must be the outgrowth of some real necessity; and the lines of its growth must be in harmony with its environment. That the State Agricultural College has grown, and that it is in harmony with its environments, cannot be doubted after a careful investigation of its history, as exhibited by the statistics contained in this report. The reörganization of this College in 1888 marks a mile-stone in its history. It then began to assume its proper sphere, and to come into harmony with the purpose of its existence.

The plans adopted in its organization demanded time for their development. It was necessary that the class should commence at the very beginning, and pass step by step through all the processes to an agricultural and industrial education before the method adopted could be fully tested and the necessary adjustments made. The period of reädjustment from a literary and classical school to an agricultural, mechanical, and industrial school has been almost completed. In June next, the first students will graduate from the mechanical course. The reörganization referred to above was an internal reörganization, the reärranging of courses of study, the organization of new departments, and the gradual introduction of industrial work. This not only demanded time for its execution, but required the greatest care to prevent violent reäctions while changing from an institution of one character to that of another. That period is, however, wholly passed.

In addition to this change in the character of work to be done, a still greater problem has constantly presented itself—the organization of what may be termed the externals of the College. Buildings adapted to the new purposes of the institution must be erected, laboratories must be fitted up, cabinets collected, machinery provided for carrying on the industrial work, green-houses constructed and the contents gathered, silos built, stock for experimenting secured, plants, shrubs, trees, grasses, and grains provided before any work in experimentation could be undertaken. This work of organizing the several departments went on simultaneously with the reconstruction of the internal work of the institution. It requires many buildings and much expensive apparatus to carry into effective operation such a school. The National Government practically furnishes the means for carrying on the internal work of the school, and has wisely left it to the State to furnish the plant and the means for their application. Only a very small part of the magnificent endowment which comes from the General Government can be used for the erection of buildings, the fitting up of laboratories, and securing the apparatus necessary for the school. These equipments the State has furnished in the past as rapidly possibly as the needs of the school required; but the institution has outgrown its earlier necessities, and now rightly makes far greater demands upon the State. The period of experiment is passed, and there is now every evidence that the school is needed and demanded by the people. That it is in happy relationship with its environments is evidenced in its growth since 1888, as will be seen by the following table:

Year.	*Preparatory.*	*First year.*	*Second year.*	*Third year.*	*Fourth year.*	*Post-graduate.*	*Total.*
1888–89	36	33	14	14	0	0	99
1889–90	67	55	17	6	0	6	151
1890–91	76	83	24	15	0	3	201
1891–92	86	63	28	19	9	3	208
1892 to January, 1893	74	121	36	14	8	2	255

The above shows a constant growth all through this period of reconstruction and reädaption. From ninety-nine students in 1888, it has now reached two hundred and fifty-five, a gain of almost 260%; while it will also be observed that the College department has increased almost 300%, and the preparatory only 200%. These are evidences of a healthful growth; and as the character and purposes of the school become better known throughout the State, its growth will not be less marked. In 1888, the College had representatives from only eight counties; in 1891, from fifteen counties; and, at present, twenty-five of the thirty-one counties are represented, as will be seen by the following table:

COUNTIES NOW REPRESENTED IN THE AGRICULTURAL COLLEGE.

Counties.	*Agricultural department.*	*Mechanical department.*	*Household economy.*	*Bachelor of Science.*	*Preparatory department.*	*Total.*
Baker	2	1	1	0	2	6
Benton	10	24	43	5	33	115
Clackamas	2	2	3	0	1	8
Clatsop	0	0	0	0	0	0
Columbia	1	3	0	0	1	5
Coos	2	1	0	0	3	6
Crook	0	0	0	0	0	0
Curry	0	0	0	0	0	0
Douglas	4	5	3	0	8	17
Gilliam	0	1	1	0	2	4
Harney	0	0	0	0	0	0
Grant	0	0	0	0	1	1
Jackson	1	0	0	0	0	1
Josephine	0	0	0	0	0	0
Klamath	1	2	0	0	0	3
Lake	1	0	0	0	0	1
Lane	1	1	3	0	3	8
Linn	5	5	6	0	7	23
Malheur	0	0	0	0	1	1
Marion	0	6	4	0	4	14
Morrow	0	1	0	1	0	2
Multnomah	0	2	0	0	3	5
Polk	3	1	1	0	0	5
Sherman	0	1	0	0	0	1
Tillamook	1	0	0	0	0	1
Umatilla	0	0	0	0	1	1
Union	4	7	1	1	1	14
Wallowa	0	0	0	0	0	0
Wasco	0	0	0	0	2	2
Washington	1	2	0	0	0	3
Yamhill	3	2	0	0	0	5
Washington (State)	0	2	0	0	0	2
Totals	39	69	66	7	74	255

This table also shows the department in which the student is at work, as well as the number of students from each county.

That the school is in harmonious relationship with its environment will be further fully demonstrated by an examination of the occupations of the parents of those who attend the school. All classes are here represented: Agriculture, 69%; laborers (unclassified), 6%; mechanics, 6%; merchants, 8%; physicians, 1%; ministers, 1%; lawyers, 2%; other professions, 7%; total, 100%.

When it is remembered that the buildings, apparatus, laboratories, etc., were prepared to acommodate only a very limited number of students, it will be seen at once that the school has outgrown its accommodations. Your attention is here called to the special needs of the school; and it would be difficult to say that any one is the least pressing:—

First—The station building which has been contemplated, and which has been partly constructed in order to relieve the pressing necessity for room, in the past, should be completed. This would give room in the College building for the proper accommodation of the College classes. This new building should contain the chemical, physical, and zoölogical laboratories, and the musuem, which, thanks to the friends of the institution, is rapidly growing, and far exceeds the capacity of the room in which it is stored.

Second—The mechanical department is now more than crowded with students in the mechanical course, and is wholly inadequate to meet the demands for training the agricultural students in the arts of woodwork and blacksmithing during the winter term. This is too essential a part of our work to be neglected. The building ought to be greatly enlarged, and the machinery duplicated. This department cannot afford to be crippled in its usefulness. Now but little attention can be given to electrical engineering; yet this is of the utmost importance to the State. Electrical plants are being everywhere established throughout the State. It is only a question whether Oregon shall import electrical engineers from abroad to develop and to utilize the power of her water-courses, now almost wholly unused, or whether the Oregon boy shall be given a chance. It is only a question of time when our rivers will furnish not only all the light for our cities and towns, but the motor-power of all our great industries. This department should be established at once, in order to keep peace with our sister States and the progress of civilization.

Third—The horticultural department needs additions to its work-rooms and green-houses, as well as increased appliances. It covers a wide field of investigation for the benefit of the State, as will be seen under the head of that department in this report; and it is doing a work that is exceedingly valuable, and hence should receive a liberal appropriation.

Fourth—The agricultural department is embarrassed for want of the proper means for prosecuting its work. The farm is doubtless sufficiently large for all our needs at present or the near future. But the purpose of such a farm is to demonstrate what can be done by good farming. Unless this is attempted, then it were better to dispose of the farm, and to turn our attention to some other field of industry. To attain reasonable results, a large part of the farm should be tile-drained. It is perhaps not more in need of this than most farms both in this and other parts of the State. For this reason, the question of thorough and systematic drainage becomes that much the more important. Up to this time no systematic plan of drainage has been attempted. If this institution is to be of real benefit to the farmers of Oregon, then our farm, which is devoted to experimental work for the general good of the State, must undertake that kind of work which will lead up to successful and practical farming. This necesssarily involves the thorough drainage of a large part of the farm. Then by contrast can be shown the advantage in farming well drained lands. In this way only can the friability and productiveness of well drained soils be shown. In this way only can it be demonstrated that the seasons can be lengthened and the kinds of crops increased. There are no difficulties in the way of thorough drainage; the outlets are easy, and the work is not needlessly expensive. It can be demonstrated in this way that drainage pays a large interest on the money invested. In addition to this, we need the work in order to illustrate to the students how to drain and how to lay tile-drains, as well as to show the effect on the growing crops, and to increase the kinds of crops that may be produced.

The extension of the barn is made necessary in order to provide room for the products of the farm as at present managed, and the erection of an additional silo is a necessity.

A dairy should be added to the agricultural department. It should not be such a dairy as would be established by an individual for the purpose of carrying on the dairying business, but a model dairy —one just large enough to meet expenses, and where students could be taught and have illustrated the principles of dairying. Might not such an education make it possible for Oregon to become self-dependent, and to furnish her own butter and cheese? If profitable farming is to take the place of the slothful; if men are to be shown how to make small farms pay; if they are to be encouraged to give up the idea of wheat culture alone; if they are to be induced to give up the thought that to raise herds of stock upon ranches of immense proportions is the chief and only road to success, then the manner of the better method on small farms must be illustrated. They must be taught by example that they do not need to own one thousand acres of land before they can make a competence upon a farm, and that they can make a good living far more certainly and easily on the small farm when well managed. Hence all the processes of small farming, including dairying, fruit-raising, and horticulture in general, should be inculcated. The importance of silos in preserving green feed through the winter and the dry season, methods of fertilizing the farm lands, the results of thorough drainage—in short all the methods of securing the largest possible returns from farm lands, must be thoroughly inculcated.

The chemical, physical, zoölogical, and agricultural laboratories are now much too small for the number of students engaged, When these are placed in the new building, they should be made sufficiently large to meet our present needs and those of the immediate future.

REQUIREMENTS.

For the station :—		
Building	$15,000 00	
Heating, plumbing, ventilation	2,500 00	
Extra apparatus	2,500 00	
		$20,000 00
Mechanical Department :—		
Building	$ 9,000 00	
Additions, boiler and engine	1,500 00	
Lathes	1,500 00	
Carpenter tools, 25 sets	750 00	
Forges, 12	800 00	
Apparatus for drawing, etc	550 00	
Electrical apparatus	1,000 00	
		$ 15,000 00
Horticultural Department :—		
Work room, tool room, potting shed	$ 1,500 00	
Extra tools and repairs	350 00	
		$ 1,850 00
Agricultural Department :—		
Barn and silo	$ 2,000 00	
Tile drainage	1,500 00	
Dairy	2,000 00	
Implements	500 00	
		$ 6,000 00
College :—		
Heating college and girls' dormitory	$ 4,000 00	
Desks, chairs, tables, etc.	1,050 00	
Repairs on college property	1,500 00	
		$ 7,050 00
Total		$ 50,000 00

JOHN M. BLOSS,
President State Agricultural College.

REPORT OF THE TREASURER.

To His Excellency, Sylvester Pennoyer, Governor of Oregon:—

DEAR SIR: We, the special committee of the Board of Regents of the State Agricultural College, to whom was referred the duty of examining and reporting on the accounts of the Treasurer of the State Agricultural College, beg to report as follows:—

We have considered the summary of expenditures and receipts furnished us by the Treasurer, Mr. A. R. Shipley, a copy of which is hereunto attached, and we have examined the Treasurer's books and the vouchers submitted by him. We find the books well kept, and that they correspond with the vouchers produced. And we report that the summary so attached hereto correctly shows the receipts and payments of the said Treasurer between the twenty-fourth day of June, 1891, and the twenty-eighth day of June, 1892.

Very respectfully,
W. P. KEADY,
W. A. SAMPLE,
Committee.

SUMMARY OF COLLEGE RECEIPTS AND DISBURSEMENTS

For the year July 1, 1891, to June 30, 1892.

RECEIPTS.

To cash	$ 1,713 30	
State of Oregon interest on land grant	9,717 42	
U. S. Government (Morrill Act)	17,000 00	
Tuition	1,587 00	
Farm and garden produce	745 85	
Miscellaneous receipts	203 39	
		$ 30,966 96

DISBURSEMENTS.

Advertising and printing	$ 210 28	
Current expenses	377 51	
Freight, express and drayage	347 75	
Insurance	715 00	
Library	283 66	
Sanitary	350 00	
Miscellaneous	109 15	
Electrical and other apparatus	1,401 59	
Scientific apparatus instruments	275 15	
Postage, stationary and telegrams	124 15	
Repairs and betterments	577 82	
Salaries	21,307 09	
Traveling expenses	709 28	
Machinery and tools	131 33	
Mechanical	405 63	
Labor	1,087 05	
Household economy	669 31	
Wood for fuel	437 15	
Supplies	268 00	
Clearing land	93 65	
Printing department	1,087 41	
		$ 30,966 96

Report of the Treasurer of said institution to the Secretary of Agriculture and the Secretary of the Interior, of the amount received under Act of Congress of August 30, 1890, in aid of Colleges of Agriculture and the Mechanic Arts, and of the disbursements thereof, to and including June 30, 1892:—

December 10, 1890, date of receipt of first installment	$ 15,000 00
May 27, 1891, date of receipt of second installment	16,000 00
Total received by institution to June 30, 1891	$ 31,000 00
Balance on hand July 1, 1891	None.
September 25, 1891, third installment	$ 17,000 00
Total available for year ending June 30, 1892	$ 17,000 00

DISBURSEMENTS THEREOF FOR AND DURING YEAR ENDED JUNE 30, 1892.

In agriculture, as per schedule A	$ 1,700 00
In mechanic arts, as per schedule B	3,810 94
In English language, as per schedule C	2,370 00
In mathematical science, as per schedule D	2,189 75
In physical science, as per schedule E	2,100 00
In natural science, as per schedule F	2,200 00
In economic science, as per schedule G	2,629 31
Balance remaining unexpended July 1, 1892	None.

I hereby certify that the above account is correct and true, and together with the schedules hereunto attached truly represents the details of expenditures for the period, and by the institution named, and that said expenditures were applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematical, physical, natural and economic science, with special reference to their application in the industries of life and to the facilities of such instruction.

(Signed), A. R. SHIPLEY,
Treasurer.

SCHEDULE A.

Disbursements for instruction in agriculture, and for facilities for such instruction, during the year ending June 30, 1892.

First—For instruction, viz:—	
For salaries of H. T. French, agriculturist	$ 1,100 00
For salaries of George Coote, horticulturist	600 00
For facilities, as follows:—	
1. Apparatus	
2. Machinery	
3. Text books and reference books	
4. Stock and material	
Total	$ 1,700 00

SCHEDULE B.

Disbursements for instruction in mechanic arts, and for facilities for such instruction, during the year ending June 30, 1892.

First — For instruction, viz:—	
For salaries of G. A. Covell	$ 1,700 00
For salaries of E. M. Belknap	780 00
For salaries of H. R. Clark	600 00
Second — For facilities, as follows:—	
1. Apparatus	
2. Machinery	87 81
3. Text books and reference books	
4. Stock and material	643 13
Total	$ 3,810 94

SCHEDULE C.

Disbursements for instruction in English language, and facilities for such instruction, during the year ending June 30, 1892.

First — For instruction, viz.:—	
For salaries of B. L. Arnold	$ 1,600 00
For salaries of J. B. Horner	770 00
Second — For facilities, as follows :—	
1. Apparatus	
2. Machinery	
3. Text books and reference books	
4. Stock and material	
Total	$ 2,370 00

SCHEDULE D.

Disbursements for instruction in mathematical science, and facilities for such instruction, during the year ending June 30, 1392.

First — For instruction, viz.:—	
For salaries of J. D. Letcher	$ 1,900 00
Second — For facilities, as follows :—	289 75
1. Apparatus	
2. Machinery	
3. Text books and reference books	
4. Stock and material	
Total	$ 2,189 75

SCHEDULE E.

Disbursements for instruction in physical science, and for facilities for such instruction, during the year ending June 30, 1892.

First — For instruction, viz.:—	
For salaries of G. W. Shaw	$ 1,100 00
For salaries of Dumont Lotz	500 00
For salaries of E. F. Pernot	500 00
Second — For facilities, as follows :—	
1. Apparatus	
2. Machinery	
3. Text books and reference books	
4. Stock and material	
Total	$ 2,100 00

SCHEDULE F.

Disbursements for instruction in natural science, and for facilities for such instruction, during the year ending June 30, 1892.

First — For instruction, viz.:—	
For salaries of Moses Craig	$ 1,100 00
For salaries of F. L. Washburn	1,100 00
Second — For facilities, as follows :—	
1. Apparatus	
2. Machinery	
3. Text books and reference books	
4. Stock and material	
Total	$ 2,200 00

SCHEDULE G.

Disbursements for instruction in economic science, and for facilities for such instruction, during the year ending June 30, 1892.

First — For instruction, viz :—	
For the salary of Miss M C. Snell, M. D.	$ 1,700 00
Second — For facilities, as follows :—	260 00
1. Apparatus	
2. Machinery	
3. Text books and reference books	669 31
4. Stock and material	
Total	$ 2,629 31

OREGON EXPERIMENT STATION.

REPORT.

CORVALLIS, OREGON, January 4, 1893.

To His Excellency, Sylvester Pennoyer, Governor of Oregon:—

SIR: As provided in section 5 of the Act of Congress usually called the "Hatch Experiment Station Act," we beg to submit to you the report of the operations of the Oregon Experiment Station for the year commencing July 1, 1891, and also a report of the receipts and expenditures on Station account during the financial year expiring June 30, 1892.

Very respectfully,
WALLIS NASH,
Secretary of the Board of Regents.

AGRICULTURAL EXPERIMENT STATION FUND.

Report of the special committee of the Board of Regents to the annual Board meeting, held at Corvallis, Oregon, June 28, 1892.

To His Excellency, Sylvester Pennoyer, Governor of Oregon:—

SIR: We, the special committee of the Board of Regents of the State Agricultural College, to whom was referred the duty of examining and reporting on the accounts of the Treasurer of the State Agricultural College, who is also the Treasurer of the Hatch Experiment Station Fund, beg to report as follows: We have considered the summary of expenditures and receipts furnished us by the Treasurer, Mr. A. R. Shipley, a copy of which is hereunto at-attached, and we have examined the Treasurer's books, and the vouchers submitted by him. We find the books well kept, and that they correspond with the vouchers produced. And we report that the summarys attached hereto show the receipts and payments of the said Treasurer of and relating to the Hatch Agricultural Experiment Station Fund between the twenty-fourth day of June, 1891, and the twenty-eighth day of June, 1892.

Very respectfully,
W. P. KEADY,
W. A. SAMPLE,
Committee.

STATEMENT OF RECEIPTS AND DISBURSEMENTS

July 1, 1891, to June 30, 1892.

RECEIPTS.

1891, September 11, cash from United States Government	$ 3,750 00	
October 5, cash from United States Government	3,750 00	
1892, January 15, cash from United States Government	3,750 00	
May 28, cash from United States Government	2,541 71	
June 28, cash from United States Government	1,207 59	
Balance from 1890-1891	70	$ 15,000 00

DISBURSEMENTS.

Fencing and drainage	$ 205 24	
Tools and machinery	297 38	
Labor	3,784 57	
Food for stock	351 41	
Freight, expressage and drayage	297 38	
Incidentals	215 35	
Library	257 27	
Postage	68 95	
Supplies	859 26	
Salaries	6,434 98	
Scientific instruments	375 71	
Live stock	260 00	
Apparatus, (chemical)	349 51	
Institutes	297 10	
Meteorology	238 85	
Bulletins	452 65	
Miscellaneous	91 80	
Moving piggeries	50 00	
On account fittings chemical laboratory	105 22	$ 15,000 00

STATEMENT OF DISBURSEMENTS BY DEPARTMENTS

For the year ending June 30, 1892.

AGRICULTURE :—		
Fencing and drainage	$ 205 24	
Labor	1,854 47	
Tools and machinery	166 49	
Food for stock	248 21	
Freight, expressage and drayage	46 22	
Incidentals	103 72	
Library	6 80	
Postage	22 60	
Supplies	155 78	
Scientific instruments	16 80	
Live stock	260 00	
Salaries	1,320 00	$ 4,406 33
HORTICULTURE :—		
Labor	$ 1,711 00	
Tools and machinery	124 88	
Food for stock	103 20	
Freight, expressage and drayage	11 95	
Incidentals	55 25	
Postage	5 00	
Supplies	201 09	
Salaries	600 00	$ 2,812 37
CHEMISTRY :—		
Apparatus and supplies	$ 349 51	
Labor	120 90	
Freight, express and drayage	156 65	
Library	57 14	
Postage	13 40	
Supplies	226 86	
Scientific instruments	247 46	
Salaries	1,100 00	$ 2,271 92

ENTOMOLOGY :—		
Scientific instruments	$ 64 20	
Labor	68 20	
Tools and machinery	6 01	
Freight, expressage and drayage	70 93	
Incidentals	11 30	
Library	94 36	
Postage	15 95	
Supplies	212 75	
Salaries	600 00	
		$ 1,143 70
BOTANY :—		
Scientific instruments	$ 47 25	
Labor	30 00	
Freight, express and drayage	19 00	
Incidentals	45 08	
Library	98 97	
Postage	12 00	
Supplies	62 78	
Salaries	600 00	
		$ 915 08
INSTITUTES	$ 297 10	$ 297 10
METEOROLOGY	238 85	238 85
BULLETINS	452 65	452 65
MISCELLANEOUS	91 80	91 80
SALARIES :—		
A. R. Shipley	$ 563 15	
Wallis Nash	500 00	
H. R. Clark	399 85	
Robert Erwin	325 00	
P. H. Irish (back pay)	118 73	
B. L. Arnold	266 60	
John M. Bloss	41 65	
		$ 2,214 98
Paid for moving piggeries	$ 50 00	
Paid on account fittings chemical laboratory	105 22	$ 155 22
Total		$ 15,000 00

STATE AGRICULTURAL COLLEGE OF OREGON.

BOARD OF REGENTS.

W. S. Ladd, President, Portland.
T. E. Cauthorn, Treasurer and Chairman Executive Committee, Corvallis.
Wallis Nash, Secretary, Corvallis.
Governor Sylvester Pennoyer, Salem (*ex-officio*).
Secretary of State George W. McBride, Salem (*ex-officio*).
Superintendent of Public Instruction E. B. McElroy, Salem (*ex-officio*).
Master of State Grange H. E. Hayes, Oswego.
J. T. Apperson, Oregon City.
John Emmett, Umpqua Ferry.
J. W. Grim, Aurora.
W. P. Keady, Portland.
A. R. Shipley, Oswego.
J. K. Wetherford, Albany.

REGULATIONS

Governing that Department of the State Agricultural College of Oregon which is known as the Oregon Agricultural Experiment Station.

Adopted by the Board July 25, 1889.

1. The Board of Regents has executive control of the Station; is responsible for its expenditures; apportions the income among the several departments of the Station; elects the members of the working force; orders and directs, in general terms, the nature of the scientific work to be undertaken by the working force, in its various departments, and assumes, from time to time, such other duties as may appear to the Board to be involved in, or arise from any of the foregoing items, including the establishments of branch stations in various parts of the State.

2. A Station Council is hereby created, consisting at first of the President of the College, the Director of the Station, and the agriculturist, botanist, and chemist of the Station force. Changes or additions may be made by the Board of Regents from time to time as fresh departments are added to the Station force, or reärrangements effected therein.

The President of the College is *ex-officio* the President of the Station Council, with the powers and functions in carrying on the business of the Council usually attached to the office of President. He is the official representative of the Station Council in its relations with the Board of Regents.

THE FUNCTIONS AND DUTIES OF THE COUNCIL.

Are—*a*. To prepare plans of scientific work and to submit same to the Board of Regents, with financial estimates for carrying the same out.

b. When such plans shall have been approved by the Board of Regents, to apportion the same among the members of the working force, and to submit to the Board periodical reports of the progress of the same.

c. To prepare and submit to the Board quarterly the drafts of the bulletins which are by law demanded from the Experiment Station, and when the same have been printed, to see the due publication of the same.

d. To promote in all practicable ways farmer's institutes in various parts of the State of Oregon, held uuder the direction of the State Agricultural College.

3. The Director of the Station shall maintain a general and daily oversight of the various departments, and report the condition of the work to the Station Council.

He shall examine and certify all requisitions for purchase demanded, and all vouchers for payments needing to be made by the departments. He shall cause to be kept, and shall be responsible for the accuracy of all Station labor accounts. He shall have charge of the Station correspondence, except in cases where the Council may apportion such correspondence among other members.

4. Each member of the Station force shall be independent in, and responsible for the work of his own department, receiving and carrying out the general instructions from the Station Council, and furnishing such periodical reports of the progress of work as he may from time to time be requested to supply. When supplies or outfit are needed, the particulars shall be shown on a written requisition, signed by the head of the department, and by him handed to the Director. All accounts or invoices for such supplies or outfit shall be procured by the head of the department in question, and, if correct, shall be so certified by him, and handed to the Director.

WALLIS NASH,
Secretary.

Corvallis, June 25, 1889.

RFPORT OF THE EXPERIMENT STATION.

Hon. W. S. Ladd, President Board of Regents, State Agricultural College:—

MY DEAR SIR: The attention of the Board of Regents is called to the following reports of the several departments of the Experiment Station.

These reports cover a period of two years, and show in a condensed form what has been done, and to some extent foreshadows what will be attempted in the future. Of course, only a resumé has been undertaken.

The station is of comparatively recent origin, and sufficient time has not been given to carry many of the experiments which are now under way to completion; yet it will be found that commendable progress has been made in all the departments.

It will be observed that a wide range of work has been undertaken, all of which will be of great interest to the State.

DEPARTMENT OF AGRICULTURE.

President John M. Bloss, Director of the Station:—

DEAR SIR: I herewith submit a condensed report of the work done in the agricultural department of the Station since 1890, and also a report of the work now in progress, and of that contemplated.

Since January, 1890, six bulletins have been issued by the department, embracing the following subjects:

No. 4. Notes on farm crops;
No. 8. Notes on varieties of wheat and flax;
No. 9. Silos and silage;
No. 11. Notes on grasses and potatoes:
No. 16. Notes on varieties and yield of wheat;
No. 20. Experiments in pig-feeding.

Experiments were undertaken by the department in 1889-90 with a view to testing the effect of our climate and soil in the production of grasses and clovers for hay and pasturage. Plats were put out on the white land and that adjacent to it. While in many instances definite results were not reached, it has been satisfactorily proved that the more hardy grasses and clovers will give good returns upon the white land, when well drained and thoroughly cultivated. Of all the subjects upon which questions have been asked, there are none of more interest than those regarding this land, hitherto considered unprofitable. The problem has not yet been solved; but from our experience and observation it can be safely said that tile-drainage must precede any permanent improvement in managing this kind of soil. The air must be brought into contact with the inert material; to do this the water must be drawn off below, so that the life-producing air may follow in its wake. Orchard grass, tall oat grass, and tall fescue have produced from one and one half to two tons of hay per acre on white land that had been partially drained. Clover has produced two tons per acre on such lands. Red-top (*Agrostis vulgaris*) and creeping bent grass (*Agrostis stolinifera*) have also done well upon white land. *Agrostis stolinefera* has withstood pasturing better than any other grass. This is an important point gained in regard to the utility of this land. Other varieties have been tested for yield of hay and pasturage, the results of which were published in bulletin No. 11. Gypsum was applied to clover in plats and in the field. The results show that the fertilizer more than doubled the crop.

In 1890-91 there were seventy-one varieties of wheat grown in plats on the farm, for the purpose of securing varieties which would surpass those then grown in this State. Out of this large number, four or five have been recommended for trial, and seed has been furnished to those farmers who have applied. About two hundred packages of seed have been distributed throughout the State. From reports received we have reason to believe that this will prove to be of great value to the State in increasing the quality and yield of the wheat crop.

Similar experiments have been made with oats. There has been less demand for new varieties of oats than wheat.

Four hundred, so-called, varieties of potatoes were grown in plats for the purpose of testing their merits as to quality and yield. If, after a trial of two or three years, any have proved better than the standard sorts, they have been sent out for trial to farmers. About three hundred trial packages of one pound each were thus distributed during the spring of 1892. Reports so far as received show that some of these varieties will add very materially to the yield and quality of the potato crop of the State.

Forty varieties of corn have been tested, with the purpose of securing a variety which is adapted to the climatic conditions of this valley. The results show that the varieties grown in the Southern States will not reach maturity in this climate, except under the most favorable circumstances. The medium-sized, early maturing, yellow dent varieties have given the best results both in grain and fodder. The type of corn represented in the variety known as "The Pride of the North" is one of the best both for grain and silage.

Twenty varieties of sorghum have been tested for two years in succession, with no favorable results so far as maturing is concerned. The "Early Amber" variety is the only one which approached maturity; and this never reached a stage that would warrant its use in the production of syrup. As a fodder plant, sorghum has several advantages. One of the most prominent advantages is its power to withstand the dry season. It roots deep and grows until frost comes. It has been fed to stock with very good results. The silo has been in practical use on the farm since 1889, and has demonstrated its great usefulness in furnishing a means for curing fodder in a climate where it is very difficult to cure green material by the ordinary process. The farm has been enabled by the use of the silo to maintain a succulent ration for dairy stock when all other sources have failed. It also enables the farmer to keep a larger number of animals on a less area than by any other means. Experiments in pig-feeding were begun September 1, 1891. The object was to test the value of feed materials grown in this State in producing pork; also, to test the value of ground and unground feed. In the Eastern States some of these points are well established; here, there has been a lack of careful experimentation along this line. Comparatively little attention has been given to the improvement and care of pigs in this State.

The results obtained in these experiments are not conclusive, yet they will serve as a guide for future work. It was reasonably well established that it is not profitable to feed whole oats or wheat in fattening pigs. Again, it was shown that it was possible to mature the pigs at a much earlier age than is commonly practiced in this State. These are a few of the most noticeable results reached in the experimental work of this department during the past two years. A more detailed account will be found in the bulletins mentioned at the beginning of this report.

A great deal of preliminary work has been necessary in bringing the farm into a proper condition for experimentation. The following experiments have been carried on during the past season:

1. Testing the yield of forty varieties of potatoes.
2. Fertilizer experiment with potatoes;
    - (*a*) With Mexican guano;
    - (*b*) With superphosphate;
    - (*c*) With Mapes' potato fertilizer;
    - (*d*) With nitrate of soda;
    - (*e*) With kainit;
    - (*f*) With wood ashes;
    - (*g*) With gypsum;
3. Effect of wood ashes in preventing potato scab.
4. Effect of deep and shallow tillage on yield and quality of potatoes.
5. Tests of yield and quality of fifteen varieties of carrots and mangolds.
6. Yield of hay from large plats of grass and clovers sown in the fall upon the bare fallow.

EXPERIMENTS NOW IN PROGRESS.

1. Pig-feeding experiments are carried on again, with some changes suggested by the work of last year.
2. Plat experiments in testing grasses and forage plants; forty plants have been put out, and it is the intention to secure as complete a list of forage plants as can be obtained.
3. Plat experiments in growing a number of varieties of wheat which have never been tested in this State, along with some varieties of known excellence.
4. Testing the growth of wheat under the following conditions:
    - (*a*) On bare fallow;
    - (*b*) After corn;
    - (*c*) After potatoes;

(*d*) After buckwheat;
(*e*) After beans;
(*f*) After oats;

Experiments showing the effect of through drainage and areation upon the clover and alfalfa.

CONTEMPLATED EXPERIMENTS.

1. Feeding experiments in testing the following:—
    (*a*) Oat grass;
    (*b*) Clover;
    (*c*) Mesquit;
    (*d*) Rye grass;
    (*e*) Orchard grass;
    (*f*) Cheat;

2. Feeding experiments testing the comparative value of silage made from:—
    (*a*) Corn;
    (*b*) Vetches;
    (*c*) Clover;

3. The continuation of plat experiments in growing grasses, grains, and vegetables, with a view of determining:—
    (*a*) Suitableness to climate and soil;
    (*b*) Yield and quality.

4. Systematic rotation of crops, to determine the exhaustive effects on the soil.

5. Experiments in dairying:—
    (*a*) Testing apparatus;
    (*b*) Testing food materials,
    (*c*) Testing individual animals;
    (*d*) Management of dairying to secure the best returns in Oregon.

6. Experiments in drainage:—
    (*a*) In acrating the soil;
    (*b*) In changing the color of white land;
    (*c*) In changing the composition of the soil;
    (*d*) In making white soil suitable for the growth of clover.

H. T. FRENCH,
Agriculturist.

HORTICULTURE.

President John M. Bloss, Director of Experiment Station:—

Dear Sir: I have the honor herewith to submit the following report of the work which has been carried on in the horticultural department during the past two years:—

Experimental orchard—The planting of an experimental orchard was begun in the spring of 1891. The purpose was to determine the hardiness of the trees, and the quality of the fruit when grown in this climate. The following number of varieties were planted: Apples, eighty-seven; grapes, fifty-seven; quinces, three; apricots, three; peaches, three; and filberts, three. Also, forty-four varieties of gooseberries were planted, to ascertain the varieties that would best resist the mildew, as well as to test the market value of each variety. A report of these experiments will be found in bulletin No. 22. Of raspberries, nine varieties; of currants, nine; and of blackberries nine varieties were planted to test their shipping qualities, as well as their flavor and productiveness.

Strawberries—During 1891 twenty-five varieties of strawberries were tested as to bearing qualities when planted in the hill and in the matted row. A report of the results will be found in bulletin No. 12. During the year 1892, the bearing qualities of three-year old and four-year old strawberry plants were tested. The results under like treatment were found to be in favor of the four-year old plants. The full report will be found in bulletin No. 22.

Tomatoes—During the spring of 1891 tests were made on fifty-five varieties of tomatoes. The objects were, first, to test the earliness of the varieties; second, to test their commercial value and comparative productiveness; third, to ascertain the best manner of training and pruning the vines, and, fourth, as to the best means of preventing the cut-worms from injuring the young vines. A full report of these experiments will be found in bulletin No. 15.

Cabbage—In 1891 a test was made of twenty-seven varieties of cabbage, to determine the earliness of edible maturity; and, in 1892, a similar test was made on thirteen similar varieties, a report of which will be found in bulletin No. 22.

Peas—In 1891 two varieties of peas were tested, viz: The "New Alaska" and the "First and Best," the object being to determine which was the hardier and the earliness of edible maturity. A report of these experiments will be found in bulletin No. 15. In 1892 twenty-five varieties, some of which had not been grown at this Station, were tested, the object being to determine the earliness of the varieties, height, and productiveness. The gophers interfered with the latter part of the experiment. The report of these experiments will be found in bulletin No. 22.

Currants—During the past three years experiments have been carried on to test the effect of pruning on the quality and productiveness of the red and the white currant. These experiments are reported in bulletin No. 22.

Gooseberries—Tests were made during the present year on the gooseberry, to determine whether the mildew could be prevented by spraying. It was found that by spraying with sulphide of potassium the whole crop could be saved. The report of this will be found in bulletin No. 22.

Old orchards—During the past three years an experiment has been made for the purpose of reclaiming an old orchard. This orchard has been planted for thirty-six years, and had probably never been pruned or otherwise cared for. The trees were covered moss; the tops were matted, and many of the limbs dead. After a test of three years, it has been fully reclaimed, the moss has disappeared, and the fruit has attained its wonted size, color, and flavor. This has been done simply by systematic pruning and the thorough cultivation of the soil. A full report of this will be found in bulletin No. 22.

All of which is most respectfully submitted,

GEORGE COOTE,
Horticulturist.

DEPARTMENT OF CHEMISTRY.

President John M. Bloss, Director of Oregon Experiment Station:—

Dear Sir: I have the honor to to submit the following report of work done in the chemical department under my direction since taking charge of the laboratory on July 5, 1891, and also outlining the work of the near future:—

Since there was found the most meager report of previous work done and of the plans under contemplation, it became necessary to outline a new field of investigation. After making the necessary reägents, considerable miscellaneous work which had accumulated in the laboratory was done, after which the regular lines of investigation were laid out and entered upon as follows:—

I—COÖPERATIVE SUGAR BEET EXPERIMENTS.

Object—The intention was to ascertain whether or not the conditions of this State were suited to the growth of beets for the manufacture of sugar; what soils were best adapted to their growth; the most economical methods of culture, as well as whether the farmer could produce the beets at a price which a factory could afford to pay.

Plan—Beets were grown by farmers in selected localities according to instructions sent out by the department. Beets were also grown on the College farm. Of the beets thus produced, ninety-six analyses were made last year.

Results—Since it was evident that in many cases instructions had not been so carefully followed as could be desired, and as there were farmers who did not send reports, only one of the above questions could be answered with much certainty. The result obtained, however, with those now at hand for this year's work, but not yet collated, will suffice to show with certainty much desirable information, not only to the farmer, but also to those interested in sugar production. There is probably no one industry which, added to those of our State, would be of such general advantage as the manufacture of sugar.

The summary of last year's work is here stated:—

Counties.	*No.*	*Averages sugar.*	*Purity.*	*Weight.*
Columbia	1	13.73	79.42	465.0
Clackamas	7	14.55	77.30	780.6
Benton	39	12.30	74.12	417.0
Douglas	9	12.99	73.45	1,009.3
Jackson	3	18.93	80.99	274.6
Lane	16	14.32	79.95	108.4
Linn	5	13.54	79.91	587.4
Marion	1	15.99	78.38	920.0
Polk	1	14.72	78.08	624.0
Union	3	15.84	79.89	658.3
Washington	11	13.96	78.79	115.4
Yamhill	1	10.73	76.64	975.0

The analyses had a wide range, from 6.77% to 22.44% of sugar in the juice. Of the ninety-five analyses, eight fell below 10% of sugar, seventy-six showing over 12%, thirty-seven over 14%. For the entire State, the average was 14.13%, with a purity of 78.08%. From the above it will be seen that beets containing a high percentage of sugar can be produced in this State. From the experiments of last year, this was the only conclusion that could be drawn, because of reasons given above, and from the fact that beets of different varieties were used in the experiment. The main question for the present year was: Given a climate and soil adapted to the growth of sugar beets, can the farmer raise them in such quantities and sell at such a price as to supply a factory at a price that it can afford to pay? Work is now in progress to determine this question. The main work in this line will be concluded this year, and at this time I can only say that the indications are even more favorable than last year for the profitable production of sugar. A very full report of the investigations with sugar beets was published in bulletin No. 17 of this Station, as well as a report on the climatic conditions bearing on this subject.

II—INVESTIGATION OF THE SOILS OF THE STATE.

(*a*) As to the chemical nature of the soils and irrigation waters;

(*b*) The effect of fertilizers on the typical soils with reference to the plant-food supply, and with special bearing on soil texture, particularly on adobe, white land, and alkali;

(*c*) Mechanical analysis of soils and its relation to texture;

(*d*) The circulation of water in the soils;

(*e*) Treatment of alkali;

(*f*) Best methods of improving the soils.

Plan—The plan is to conduct this work as rapidly as possible, both in the laboratory and by coöperative work with the farmers of the State, extending it over a large number of analyses for a series of years, and publishing results as soon as sufficient data are secured. Supplemental to this it is also intended to prepare a soil map of the State.

Results—Analyses of about thirty typical soils have been made chemically and in part physically. If we can judge anything from this number of analyses, the indications point towards a low supply of potash in the Willamette valley soils.

Intention—It is the intention of the department to extend these investigations during the year, paying especial attention to the physical conditions and to alkali soils.

III—MISCELLANEOUS.

The miscellaneous analyses made between July 1, 1891, and July 1, 1892, were as follows:

Analyses of mineral waters	2	
Sanitary examination of water	2	
Analysis of gypsum	1	
Analysis of water deposit	1	
Analyses of iron ores	4	
Analysis of coal	1	
Analyses of various minerals	6	
Total	—	17

To which may be added the following from the Food Commissioner:—

Analysis of butter	1	
Analysis of milk	1	
Analyses of baking powders	8	
Total	—	10
Total miscellaneous to July 1, 1892		27

This, with the sugar-beet and soil analyses, making a total of one hundred and seventy-seven analyses to that date, involving over two thousand determinations.

Since July 1, 1892, the following miscellaneous work has been done:—

Well waters analysed	3	
I. X. L. compound	1	
Minerals analysed	2	
Gypsum	1	
Total	—	7

From the Food Commissioner :—	1	
Bottled mineral water	11	
Milk	3	
Butter	—	15
Total from Food Commissioner		—
Total miscellaneous		22
In regular lines of work :—	61	
Analyses of sugar beets	20	
Analyses of soils partially mechanical	5	
Analyses of feeding stuffs	—	86
Total		—
Total from July 1, 1892, to January 1, 1893		113

To which may also be added five samples of condensd milk not yet completed, making a total miscellaneous to January 1, 1893, of twenty-seven analyses.

The total value of work done for the Food Commissioner in the discharge of his duty, estimated at the usual price for such work, is $355. For this the department received no pay.

As to the other intended lines of work, I beg leave to state that there were experiments begun in 1890 to determine the following: The effect of climate and soil on the chemical composition of wheat—In connection with this line of work fourteen varieties were analysed by my predecessor, and the results published in bulletin No. 4 of this Station. It is intended to conduct this research further, extending it over a series of years, growing different varieties of wheat on the various soils, making analyses, and when a sufficient number have been made, tabulating the results, and drawing conclusions as to the merits of the varieties under the several conditions.

Experiments to determine the chemical valuation and comparative feeding value of the various cattle foods of the State—Some work has already been done along this line, the results of which are published in bulletin No. 5. It is intended to extend these investigations, and to include therein a thorough chemical study of the grasses and clovers of the State. Analyses are now being conducted in this work. The latter portion of the work will de done in conjunction with the botanist, who will at the same time classify these plants.

The above mentioned lines of investigation, together with the miscellaneous work which comes to the laboratory, will furnish sufficient employment for some time to come. Submitting the above report to you, I am, sir,

Yours very respectfully,

G. W. SHAW,
Chemist.

DEPARTMENT OF BOTANY.

President John M. Bloss, Director of the Experiment Station :—

DEAR SIR: I have the honor to submit the following report on the condition of the botanical department:—

This department was first organized in 1888. Having been begun without either herbarium or apparatus, time was necessary for the collection of even a small herbarium and the necessary apparatus for laboratory work. To this primary organization a period of three years was wholly devoted by my predecessors. Commencing at the beginning, the constant endeavor has been to lay a foundation for future work by keeping careful records of what has been done. Circulars were prepared and sent to farmers, requesting information regarding troublesome and obnoxious plants. From this bulletin No. 19 was prepared, being an illustrated pamphlet of 48 pages, on "Some Oregon Weeds, and How to Destroy Them." It describes weeds most injurious to growing crops, the injury caused, and the best methods to prevent this injury. A large number of letters asking information about medicinal, weedy, and poisonous plants, plants best adapted to certain localities, various grasses, the causes, prevention, and cure of various plant diseases, etc., have been received and answered. These have been carefully filed, together with copies of answers returned. Nearly 200 plants have been sent to this department for determination, and full accounts have been returned of their properties, history, and habits. The herbarium has been built up, both by collection and exchange, the old cases extended, 100 new shelves added, and the entire collection reärranged and labeled according to recent botanical nomenclature. It is now the best college collection in the State. A large number of flowering plants and several hundred fungi have been mounted, and a large number of duplicates collected, named, and arranged during the last summer. A catalogue of accessions is kept, so that any plant can be readily found when needed. Exchanges, which will greatly enlarge the collection, are now being carried on with other botanists. Specimens of the most injurious and obnoxious weeds, the characteristic grasses, the economic fungi, and some typical plants of this State have been collected and sent to the committees appointed by the Association of Experiment Stations for the Columbian Exposition. For these due credit will be given to this Station. New cases have been built for instruments and supplies, thus greatly increasing the space available for the herbarium. Many other improvements have been made in the room, which is well adapted for the botanical laboratory.

Since October 1, 1891, this department has had charge of the mailing of bulletins for the Station. There were in 1891 about 1,800 names on the list; now there are about 5,000. The following outline of work intended to be done in this department of the Station is herewith submitted.

First—A study of the weedy and poisonous plants of Oregon, in order to find out the best method of remedying their ill effects, and to disseminate this information among the farmers of the State.

Second—A study of plant diseases, and their influence on cereals, vegetables and fruits. In view of the numerous requests for information regarding fungous diseases, a bulletin will be issued this winter on "Plant Diseases, and How to Combat Them." It is intended during the next spring to visit the principal vineyards and orchards of Benton and other counties, and carry on experiments with fungicides against the downey mildew of the grape, apple scab, peach and pear blight, etc.

Third—To make a study of the grasses and forage plants of the State in coöperation with the station chemist. This work has already been begun; the results, it is hoped, will be ready for publication next fall.

Fourth—A study of forest conditions; first, with a view of preventing the great waste of timber by means of forest fires; and, second, to introduce tree culture in the eastern part of the State.

Fifth—To make a collection for the herbarium of as many specimens as possible of Oregon plants, and by exchange to increase the working collection.

Sixth—To collect as many species and forms of parasitic fungi as possible, preparatory to cataloguing the rusts and mildews of the State.

The above work will require a number of years for its completion, and other lines may be taken up simultaneously with these.

This summary is given to show the general character of the work to be followed, subject, of course, to such modifications as exigency may require.

Respectfully submitted.

MOSES CRAIG,
Botanist.

DEPARTMENT OF ENTOMOLOGY.

President John M. Bloss, Director of the Experiment Station:—

Dear Sir: Please find herewith a report of the work completed during the past two years, also of other work contemplated in the entomological department:

WORK COMPLETED.

Codlin moth—Experiments with the Codlin Moth have been continued, and a mixture of IXL water and Paris green has been found to be very effective, calling for fewer sprayings than anything tried hitherto, and proving to be comparatively inexpensive.

Wire worms and cut worms—Part of the six hundred pounds of kainit and muriate of potash donated the Station has been used against these pests, both at the Station and by a few trustworthy observers elsewhere. The season just past has been one in which wire worms and cut worms have done but little damage, hence no results have been recorded. Incidentally, it may be said that crops to which these salts were applied made a better growth than crops untreated.

The branch form of woolly aphis—This is one of our worst pests. It has been found that in spraying the fruit with IXL mixture for the codlin moth, as above referred to, the woolly aphis can be attacked successfully by spraying the colonies forcibly. While this does not exterminate them, it keeps them so completely in check that their ravages need not be feared. This spraying can be done at the same time that one sprays for codlin moth.

Hop louse—Bulletin No. 10 was issued in April, 1891, on this serious pest, giving the life-history, remedies, and observations of the entomologist on this pest in Oregon. Since then quite an extensive correspondence has been carried on with hop-growers. Many plant lice thought by them to be hop lice were sent to the Station, and frequently found to be species other than the hop louse. The best remedy used by our hop-growers as yet has been the quassia and soap solution, sprayed on the vines at intervals during the latter part of the growing season. Kerosene emulsion is also good as a spray, and has been used effectively, but its preparation and use requires such extreme care that the former remedy is safer for our hop-growers. Hops have been planted at this Station for experimentation.

Other plant lice—A number of other plant lice have been experimented with, and remedies found.

Gophers and moles—It has been found during the season that when the pocket-gopher finds no tender root crops in the fields, he can be poisoned by placing powdered strychnine in small pieces of potatoes, and depositing them in their burrows. No absolute evidence other than that the digging was discontinued, is offered as to the success of this method. Of a large number of traps put on the market claimed to be good gopher traps only two were found to be effectual. Moles can be reached by both of these traps. The entomologist has personally witnessed a mole in captivity eating vegetables. Experiments have been made successfully in killing moles by placing small pieces of poisoned beefsteak in their burrows.

Caponizing cockerels—Twenty-four cockerels were caponized, and subsequently received the same treatment, as far as food, exercise, etc., were concerned, as other fowls of the flock. The above experiment having been carried on with the fowls of my own flock, the conditions were practically the same as they would be on the farm. In some of the Eastern markets capons bring 35% more per pound than ordinary chickens, and men engaged in the market business say that fancy prices can be obtained for caponized fowls on this coast. A capon recently killed at the age of eighteen months was found to weigh ten and one half pounds, and the meat was remarkably fat and tender. There is no noisy crowing or quarreling done by capons.

The grain-beetle—This pest was treated of in bulletin No. 5, and the remedy suggested there (fumes of bi-sulphide of carbon) was tried in the granary of Mr. Finley, near Corvallis, with success. Other instances of its successful use are reported.

Sugar-beet beetle—This pest was found to attack sugar beets at the College and elsewhere, and has been successfully combated with Paris green and water.

Five bulletins—Nos 5, 6, 10, 14, and 18, have been issued by this department. The first half of No. 6 was devoted to chemistry. In addition to other correspondence, over two hundred inquiries in reference to insects have been answered. The Station collection of Oregon insects now numbers more than two thousand specimens.

WORK PROPOSED.

1. Confirmation of this season's work with the codlin moth.
2. A continuation of experiments with potash salts against wire worm and cut worms.
3. Further observations on hop louse remedies, using as far as practicable, the vines planted this season.
4. Further experiments against the branch and root forms of the woolly aphis.
5. Further tests of traps and poisons against gophers and moles.
6. Further experiments in caponizing cockerels.

7. It is hoped to exhibit in the alcove for the exhibit of the United States Experiment Stations at the World's Fair, a collection of Oregon insects, machinery used in spraying fruit trees, traps used against gophers and moles, and specimens of these marauders; and also a number of photographs illustrating the work of the department.

8. A bulletin will be issued in March on "Work with the Codlin Moth;" "Results of Experiments with Gophers and Moles;" and "Notes on Hop-lice."

9. Later on, an illustrated bulletin will be issued on "Capons and Caponizing

It is not always possible to carry out all the work proposed, on account of unforeseen circumstances.

Respectfully yours,

F. L. WASHBURN,
Entomologist.

DEPARTMENT OF PHOTOGRAPHY AND ENGRAVING.

President John M. Bloss, Director of the Experiment Station :—

DEAR SIR: I herewith submit the following report:

The department of photography and engraving, which has been established in connection both with the College and the Station, is one of great importance to each, and since the time of its establishment has made rapid progress. In the College, photography is taught as an elective study to those who are in the third and fourth years' work. The following work has been done since this department was organized: One thousand eight hundred photographs appertaining to college work, including college scenery, and forty-two engravings for illustrating bulletins and college catalogues, etc., representing altogether a value of about $600, have been made. The demand for illustrations in the bulletins is increasing, and it is necessary that this work should be done. A large number of micrographs, lantern slides, and numerous illustrations of the work of the College and Station have been prepared by this department. Stereopticon slides have been made of experimental work in various scientific subjects for illustrating lectures.

A very important and useful feature of this department is the work of photo-micrography. Many specimens of diseased fruit trees, fruits, and vegetables are sent to the various departments of the Station to have the cause of the disease found and the remedy suggested. These come from all parts of the State. In many cases micrographs are made of sections of the diseased parts and placed in contrast with micrographs of corresponding healthy growths.

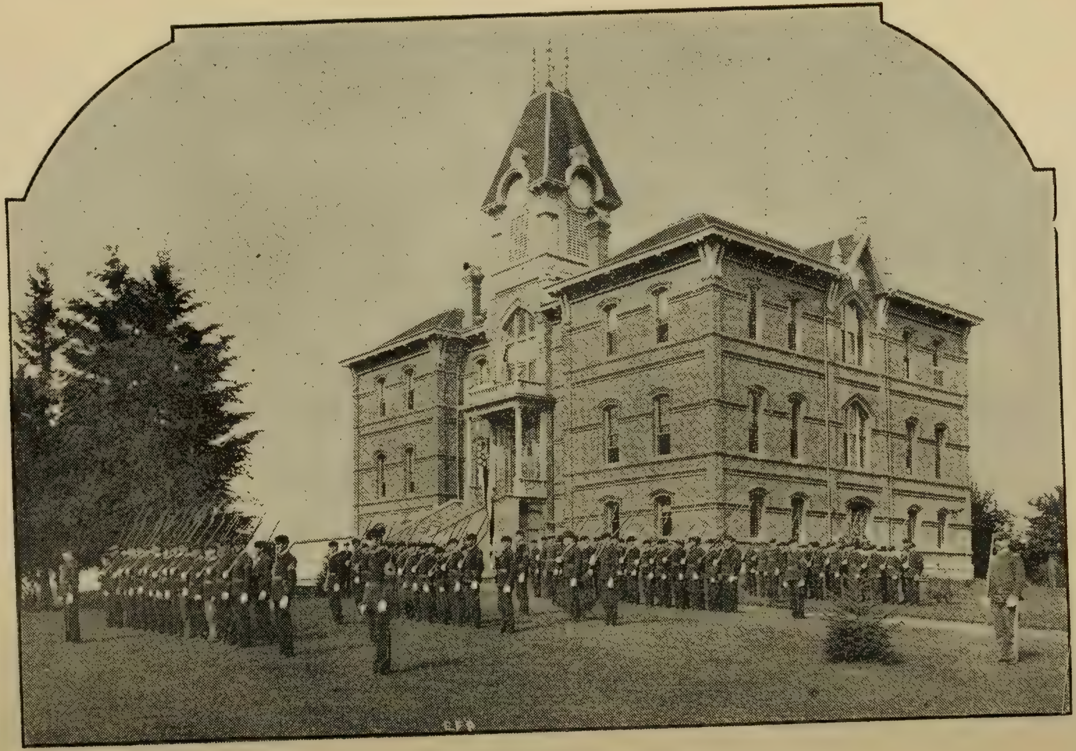
These micrographs are returned to the inquirer with suggestions for treatment. This is important, because it leads up to a proper study of disease. The importance of this department has been demonstrated, although the conveniences and opportunities for work are very limited. The needs of this department are: Suitable apartments, an enlarging and reducing camera-stand, and other articles; the equipment for engraving is incomplete, and many things are needed to take the place of those that are now improvised.

Respectfully submitted,

E. F. PERNOT.

All of which is most respectfully submitted.

JOHN M. BLOSS,
Director of the Station.



State Agricultural College, Corvallis.

ANNUAL REPORT

OF THE

PRESIDENT OF THE BOARD OF REGENTS

OF THE

STATE AGRICULTURAL COLLEGE

TO THE

GOVERNOR OF OREGON.

Legislative Assembly, Eighteenth Regular Session.

1895.

PUBLISHED BY AUTHORITY.

SALEM, OREGON:
FRANK C. BAKER, STATE PRINTER.
1894.

To His Excellency, Sylvester Pennoyer, Governor of Oregon:—

SIR: I have the honor to forward to you the following report from the president of the board of regents of the State Agricultural College of Oregon.

Very respectfully, WALLIS NASH, Secretary.

CORVALLIS, Oregon, January 7, 1895.

REPORT.

To His Excellency, Sylvester Pennoyer, Governor of Oregon:—

SIR: In accordance with the law of 1885, under which the reorganization of the State Agricultural College of Oregon was carried into effect, it becomes the duty of the president of the board of regents to submit a report of the operations of the college, and also of the experiment station connected therewith, for the year commencing July 1, 1893, and ending June 30, 1894.

With this report is also furnished a report of the receipts and disbursements of the college account for the same period, which has been examined and approved by the special committee of the board of regents. A copy of their report is also sent.

When a similar report to the present was last addressed to the governor of Oregon it was signed by W. S. Ladd. He was the then president of the board, and had filled that same position since the first meeting of the board acting for and under the direct authority of the State. The death of Mr. Ladd was a great loss to the State Agricultural College, since his interest in its operations was real, zealous, and self-sacrificing, and it was a sincere grief to his colleagues on the board, who still miss his genial presence and wise counsel.

In July, 1893, the college was deprived by death of the services of Mr. A. R. Shipley, the treasurer, who had succeeded the late T. E. Cauthorn in that office. To his memory it is right also to bear testimony as one who gave his best services to the college, and perseveringly and earnestly discharged his duties even while the hand of disease was pressing hardly on him.

On the death of Mr. Shipley, Dr. J. M. Applewhite was appointed a regent, and as one of the resident members of the board, was elected to fill the office of treasurer. On his death, in May, 1894, the Hon. J. K. Weatherford was, by the unanimous vote of his colleagues, elected treasurer. After duly qualifying he has promptly entered on the discharge of his duties.

When the last printed report to the governor was rendered John M. Bloss had but recently been appointed president of the college and director of the experiment station. It was then too early to speak confidently of the success of his management and control of the institution, although the board was then already well satisfied that the selection of President Bloss had been a wise one. The experience of the last two years has continued to justify the appointment of President Bloss.

The board believe and are satisfied that the college has been well, prudently, and energetically managed throughout its many and various departments. They are satisfied, also, that the experiment station is fulfiling its functions to the benefit of the citizens of Oregon. A more extended account of that branch of the institution will be found in the report specially devoted to it.

Prior to the commencement of the last college year the board determined to limit the entrance to the preparatory department to those students who, from their place and conditions of previous education, had not been in a position to avail themselves of the advantages of graded schools. It appeared to be desirable, on the one hand, to keep the doors of the college open to those who had been deprived of the previous training of the graded school, but who, living far from cities, had yet made the best use they could of the country school with its short terms, mingled classes, and single teacher. On the other hand, it was certainly right to raise the standard of admission to the college for such students as either had, or should have passed through, and graduated from the graded schools of the larger towns and cities of the State.

The board of regents desired that the State Agricultural College should attract and invite the selected, industrious, and successful pupils of the graded schools throughout the State. The course of such students, in those schools, had demonstrated both their demand for and their appreciation of the higher education provided by the bounty of the nation and the wisdom of congress in the colleges maintained by the nation in every State, for wider, higher, and more thorough training in "agriculture and the mechanic arts, not omitting the usual branches of a liberal education."

Therefore the board of regents declined to admit into the preparatory department pupils from towns and cities of fifteen hundred population; but they maintained that department for the special benefit of the farmers' sons and daughters, whose *alma mater* had been the little schoolhouse by the cross-roads.

While the numbers of the students have not suffered any material diminution from the adoption of this rule, there is no question that the general average of the students, both in age, literary standing, and general demeanor, has been perceptibly elevated.

It has been the aim of President Bloss (and in this he has had the cordial support of the board of regents,) to raise the standard of instruction in the English language and literature, and in the arts of composition and expression. He has succeeded in stimulating the interest of both professors and students in these departments, as has been evidenced by the public work of the students in the literary contests for the possession of the gold and silver medals presented by President Bloss as meeds and tokens of their success.

But this advantage has not been gained by the surrender of any of the branches of technical and scientific work which are the special aim of the State Agricultural College. On the contrary, there is abundant proof that the faculty have been both zealous and successful in their various and multiform departments. The board are conscious that the time of both professors and students is only too fully occupied in the many and diverse lines of study in the courses as now arranged. They feel that while the limit of three years is set for so many of the students, (as must apparently be the case while the study time of the average Oregon young man and woman is kept within its lines by the pressure of the necessities of daily life,) any changes in the studies taught should be rather in the deepening of the amount of study given to any branch than by adding more departments to a three years' course already overfilled.

The report of President Bloss, accompanying this report, will deal in greater precision and fullness with the college work. It remains to add that the legislature of 1893 generously appropriated a sum of $26,000 for the new buildings, equipment, and outfit demanded by the growth of the college and station work. Of this amount, $11,500 has been expended by the board in the four departments of agriculture, horticulture, mechanical arts, and photography, by the erection of the new buildings required. The sum of $3,776.99 is available for equipment during the year 1894–5. The balance of the fund is unfortunately in litigation at this time, (owing to its having been deposited in the bank of Hamilton, Job & Co., which failed in June, 1893) and the outcome cannot, at the time of preparing this report, be predicted with any certainty. The board, it may suffice here to say, are using every effort to secure the college against ultimate loss on this account. They have, meanwhile, limited their expenditure within the amount of available funds, a course which they will continue to follow.

It is a matter of much satisfaction to the board, and they think that the citizens of Oregon are to be congratulated on the fact, that the hard times, and consequent straightened circumstances of so many, have not had more effect in keeping worthy and energetic students out of the State Agricultural College. The maintaining of the large number of students during the year 1893–4 is a most satisfactory token of the appreciation throughout the State of the kind and quality of the education provided here. Every effort will be made to continue to disseminate through all classes and in all localities in Oregon the advantages of technical education, pursued under the specially trained professors and instructors, and with the aid of the costly and varied equipment of the State Agricultural College.

In the spring of this year the general government responded to the request of the board for an instructor in military science and tactics demanded by the law, and Lieutenant Dentler was accordingly detailed for this purpose. The male students have, therefore, had during the past three months the advantage of military drill and discipline, and have, as reported by Lieutenant Dentler, made good progress in this department also.

During the year now closing, the holding of farmers' institutes in various parts of the state, by and under the auspices of the Agricultural College, has been pursued with regularity and diligence. The meetings have been of a very practical kind. The professors chosen to attend have been selected with an eye to the nature of the farming, stock-raising, or horticultural industries followed in the special localities. Their presence has always been welcomed, and the variety of questions put to them and the discussions which have followed their answers, have showed the appreciation of the audiences.

During the year past, the college has been visited by a largely increased number of persons interested in the work there carried on. The variety of the pursuits and studies of the students, the nature and value of the outfit and equipment of the several departments, are matters of invariable remark. The board trust that many more of those interested in advanced and technical education, as applied to the farm, the orchard, the workshop, and mechanical pursuits generally, will come and see for themselves the developments of the system now in full operation at the State Agricultural College.

For the board of regents.

WALLIS NASH, Secretary.

Corvallis, December 1, 1894.

REPORT

OF

THE PRESIDENT OF THE STATE AGRICULTURAL COLLEGE

AND

Director of the State Experiment Station.

Governor Sylvester Pennoyer, President of Board of Regents, Oregon Agricultural College:—

DEAR SIR: I herewith transmit to you, and through you to the board of regents, the report of work of the State Agricultural College for the past two years. I entered upon my work as president of this institution June 1, 1892, and it became my duty to make the biennial report for the preceding two years at the close of that month.

In that report the purposes of the State Agricultural College were set forth, and it was shown that the school was in alignment with the intention of its originators.

During the past two years my attention has many times been called to the fact that the purpose of the school and its field of work are not yet well understood by the people. The name, Agricultural College, is to many misleading; therefore those who have no other means of knowing what the institution is, except through its name, assume that it is a place where young men are taught that which they are already supposed to know—how to plow, to reap, and to sow. Many intelligent persons who visited the school within the past two years have expressed their surprise at the breadth of culture here given, and have admitted that the name had misled them as to the purposes of the school. They were not aware that it is as truly a mechanical and economic school, as it is an agricultural and horticultural school.

The work of this college can be best discussed under two general heads, viz., the Literary, and the Technical work.

LITERARY WORK.

The literary work of this school may be divided, for convenience of discussion, into two general heads—first, that in which the primary object is to give culture and to prepare the student for good citizenship; and secondly, that which underlies and is preparatory to the technical education which he has chosen.

CULTURE STUDIES.

While it is true that all branches studied result in culture, it is equally true that those branches whose primary object ends in culture are of great importance in preparing the student for his work in agriculture, horticulture, household economy, and mechanics. Thus, much stress is placed upon English, not only as the necessary basis of all education here, but also because it is the key which unlocks the treasure-house of knowledge to the American student. A knowledge of grammar, rhetoric, and logic, etc., for themselves is comparatively valueless. It is true that mental growth may be attained through the study of these, as well as of other sciences, but through these there is more to be gained than simply mental discipline. These are practical subjects, and to be of use to the student, the laboratory process must be applied, just as is done in chemistry. Hence the study of the use and power of words by means of works on synonyms, and through practice in composition, receive attention in the classroom. To further develop the student, regular literary work, under the direction of the whole faculty, is carried on weekly in the literary societies. Monday afternoon of each week is devoted to this work. These exercises consist of essays, debates, recitations, and select readings. This work is so arranged that each student comes on duty every other week.

This, while it lays some additional burden on the members of the faculty, gives ample return in the added power gained in mastering the technical work of the school.

But there is an additional reason for the study of English. Knowledge is said to be power; but it is not available power to the world unless its possessor can give it expression.

In the classroom, the study of the history of the language,—its growth and development—the study of the great writers in prose and fiction,—all tend to cultivate and prepare the student not only for an appreciation of good literature, but for a better means of expressing thought.

Under this division may be placed history—modern, mediæval, and ancient—as well as political economy, psychology, and ethics. The value of these studies is so apparent that they need no discussion.

No foreign language, except Latin, is embraced in the curriculum, and this is optional except to those who desire to take the degree of Bachelor of Science, or Bachelor of Letters.

SUBJECTS UNDERLYING THE TECHNICAL WORK.

There are many subjects in every curriculum which in themselves may seem unnecessary, yet a little investigation will show to be essential, because they underlie the technical knowledge which the student most desires.

Thus arithmetic, algebra, geometry, and calculus, etc., each in turn becomes essential to some work of the college, viz.: Arithmetic to bookkeeping; algebra to the higher phases of geometry, chemistry, and philosophy; geometry and trigonometry to surveying and civil engineering; calculus to the applications of mechanics and mechanical engineering.

Free-hand drawing is not only a culture study, developing the æsthetic nature, but is invaluable for cultivating the power of observation, so essential in all technical work. Drawing itself is a form of expression and becomes a means of illustration in all the sciences. Chemistry, geology, botany, and zoölogy in their elementary forms bring us face to face with Nature's laws and in this sense become culture studies, as well as foundation for the technical work.

TECHNICAL STUDIES.

There are three general courses,—the agricultural, the mechanical, and that of the household economy; and a line of study is adapted to each. All these look forward to the preparation of the student for some business industry.

The agriculturist must have a special knowledge of the science of chemistry and be able to make both qualitative and quantitive analyses. This involves analysis of soils, as well as determining the food values of grains and grasses.

This line of work, it will be observed, leads to a special field—agricultural chemistry. But chemistry underlies, to a great extent the science of geology and mineralogy and thus is the means of opening another special field—metalurgy.

What could be more important to the citizens of Oregon than thus to lay bare its mountain wealth, and to discover and adapt to its rich valleys new food plants?

Zoölogy leading up through comparative anatomy, and physiology, precedes and forms the basis for the study of veterinary science, entomology, and ornithology. These are, alike, subjects invaluable to the agriculturist and horticulturist.

Entomology itself has become a special field for investigation and rich finds are yet to be made along this line.

To these must be added a scientific and practical knowledge of drainage, methods of preparing the soil for the crop, the study of the history of the breeds of stock, methods of feeding, the preparations of foods, and the study of food values, the silo and the preparations of silage, each of which is a most valuable subject for discussion and investigation.

But in addition to this the student of agriculture must have prosecuted his study of botany far beyond its elementary form. Structural botany, plant physiology, the hygiene of plant life, are each subjects in which both agriculturist and the horticulturist are intensely interested. The diseases which attack plants again open up new fields which can only be studied under the microscope —hence microscopy, a field of work in itself, must be mastered. The study of fungous diseases and their remedies—the effect of climatic conditions on vegetable growth—are each subjects for consideration in economic botany. Entomology here touches upon the science of botany, since it is necessary to know what insecticides will destroy the insect and not injure the plant.

Horticulture, as is well understood, is but a subdivision of agriculture; hence the agricultural student must have studied horticulture as a science and an art before he is prepared to graduate. He must understand grafting, layering, and budding. He must understand the best means of cultivating roots, fruits, and flowers. Here is opened up a wide field in which every citizen in Oregon is interested. There is a philosophy here to be taught which is invaluable. New flowers, fruits, and vegetables are each year invented, or introduced, and from the old-fashioned plants, fruits, flowers, and grains, newer and better varieties are each year developed. In the past these were secured by accident. But cross-fertilization is a most important subject in all departments of agriculture. The student in agriculture in this school must become acquainted with all these subjects. In addition to this he works three months the first year in the carpenter shop, and three months the second year in the blacksmith shop, so becoming acquainted with the tools he must use on the farm.

Those who complete the household economy course have all the literary work of those who complete the course in agriculture, and, in addition, horticulture and floriculture, and many of the phases of landscape gardening. But their distinctive industrial work includes sewing, millinery, cooking, the chemistry of cooking; in fact, all that goes to make up the art and science of household economy.

In this department, too, they receive a special course of instruction in the study of their own organisms, — how to secure health, and to maintain it. I know of no work which is more important; it covers a wide field.

The mechanical student completes all the literary work of the school, and all those branches which underlie the mechanical work of the special department.

Having completed his work in free-hand drawing, he is now prepared to enter upon the work of mechanical drawing, which, later on, is the basis for his work in architectural drawing. His industrial work for the first year is in wood, which is all wrought from prepared designs. His industrial work for the second year is in the blacksmith's shop. Here he not only designs, but fashions his work in accordance with the plans prepared.

His third year's industrial work is in the machine shop, where he learns how to fashion iron, cast or wrought, into useful forms. The science of mechanics is the basis for all his work. The science of the machine, and the strength of materials, are each involved. His fourth year involves the application of calculus to the determination of forms, to the strength of materials, and to the application of forces which give the best result. The steam engine and the dynamo must be mastered in both theory and practice. His industrial work consists in the manufacture of a complete machine, including making the design, preparing the patterns for casting, and the work necessary to its complete adjustment and fitting up in the machine shop. The machine manufactured last year was a dynamo which was to operate eight sixteen-candle power incandescent lights. This year the students have made a five-horse power engine.

The above is an outline of the work which has been carried on in each of the past two years. Industrial work of one hour each day is required of each student. Although this work is not, as a rule, profitable as an investment to the institution, yet it is of great value to the student. It is practically the laboratory work in those technical sciences in which the student is engaged.

The requirement of laboratory work in all the scientific branches during the last two years has been extended.

In chemistry, physics, physiology, zoölogy, entomology, and botany, laboratory work of two hours is required each other day. In this respect we are keeping abreast with the best scientific institutions in the United States.

The work above indicated in each of the departments has been pushed forward with commendable earnestness. The success has been the greater because of the harmonious and enthusiastic work of each member of the faculty.

MILITARY SCIENCE AND TACTICS.

Instruction in military science and tactics, as you are aware, is required in all land grant colleges. This work for the first year and a half covered by this report was under the charge of one of our professors. During the last half of the present year this work has been under the direction of a United States army officer, detailed by the general government for that purpose. The energy which he has displayed and the work accomplished are very commendable.

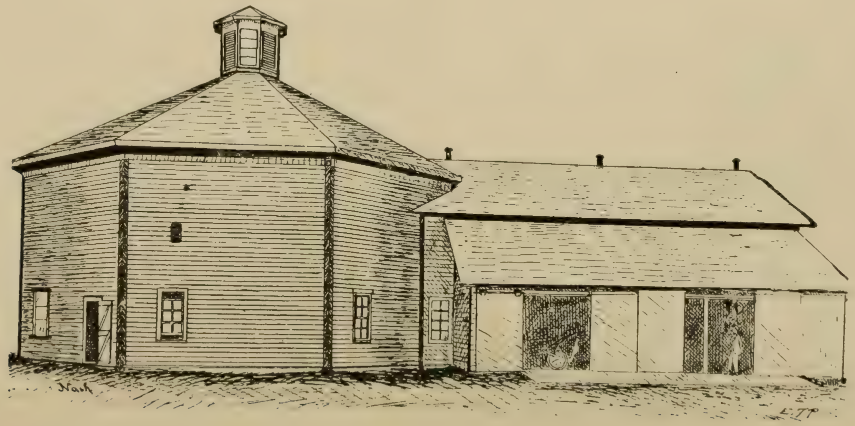
Here it would be proper to state that the climate of Oregon is such that many days during the regular school year are unfitted for military drill in the open air. During the past winter and spring months it has been necessary to have the military exercises in halls and unoccupied rooms. These are comparatively small and not fitted for the purpose. I would suggest that at an early day a building suitable for an armory and gymnasium be erected. It should be so arranged that it could be converted into a large hall, where our graduating exercises could be held.

I would further suggest that the board make application for 200 stand of arms from the government, and also for two pieces of artillery. The arms that we now have are not sufficient to equip the students in attendance. The drill in artillery would not only be useful in itself but be equally valuable as a means of discipline.

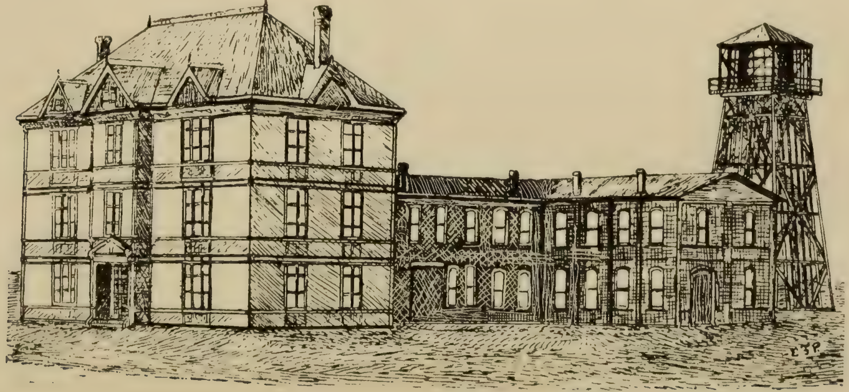
FARMERS' SHORT COURSE.

This course was organized during the past year for the purpose of offering to the practical agriculturist and horticulturist, and to those interested in such work, a course of instruction which would assist them in their vocations.

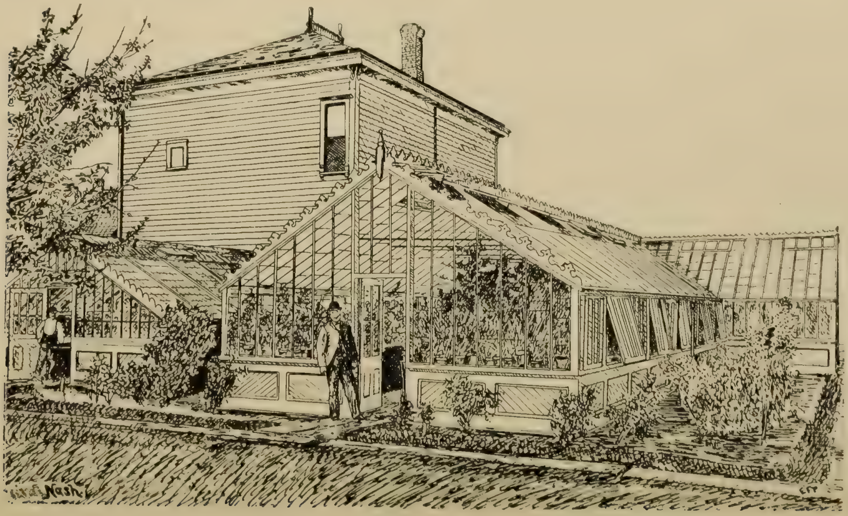
This being the first attempt of the kind in the West, and the purposes not being well understood, it has happened that (as was expected) the number enrolled was small. The enthusiasm, however, of those who entered on the work was none the less for the smallness in numbers. The number enrolled was fifteen. The course consisted of eighty lectures, embracing botany, chemistry, etomology, agriculture and horticulture, poultry-raising, drainage, etc.; and, in addition to this, laboratory work in the various departments. The course began January 10, 1894, and closed February 7, 1894, comprising twenty working days. In this course no educational requirements for entrance were made; all practical farmers or horticulturists were admitted. No fee for tuition was charged. The work accomplished was valuable. The work will be continued during the coming year, and it is hoped that a larger number of



Barn with Addition.



New Mechanical Hall.



Horticultural Hall.

men and women will undertake it. I know of no way in which the State Agricultural College can in the same length of time do more for the people of Oregon.

IMPROVEMENTS.

The appropriation of $26,100 made by the last legislature has been partially expended. All the buildings proposed at that time have been erected in accordance with the plans proposed, and many of the other improvements made. All that was proposed would have been done but for the closing of the bank which involved the locking up a part of the fund. The release of at any rate a large percentage may, it is hoped, be secured before very long. The work done, briefly stated, is as follows:—

First—An addition has been made to the barn, 32 x 60 feet, two stories in height, and a shed 14 x 60 feet. This building was fitted with floors and stalls for cattle. The building also includes two silos, with a capacity of sixty tons each.

Second—An addition has been made to the mechanical building 80 x 38 feet, three stories in height, and with a wing connecting it with the old building 40 x 32 feet, and two stories in height. This building has been completed in all respects, but the machinery, which it was intended to add, has not all been purchased, although enough has been put in to meet the pressing needs of this department.

Third—A horticultural building, two stories in height, 30 x 40 feet, has been erected, and a greenhouse, 20 x 50 feet, has been added. This building has been completed. A new furnace, with piping for heating, was put in place in the fall of 1894, and has since been in successful operation. This gives our greenhouses an area of 2,500 square feet of floor surface. The second story of the horticultural building has been fitted for the photograghic department. The first floor has been fitted for a classroom for instruction in horticulture and floriculture, etc. The basement is occupied by the fuel and heating apparatus.

Fourth—A storehouse, 20 x 30 feet, one story in height, has been erected for the dormitory. This was necessary in order to preserve fruits and vegetables.

Fifth—New furnaces have been placed in the college building.

Sixth—About 2,000 feet of drain tile has been laid in pursuance of the plan for the drainage of the college grounds.

Besides the above, some minor matters in repairs of buildings, and in the adjustment of the grounds and the walks, have been accomplished.

ATTENDANCE.

The attendance, although the times have been hard, has been excellent, as will be shown by the following tabulated statement:—

Year.	Preparatory.	First.	Second.	Third.	Fourth.	Post graduate.	Total.
1888-89	36	33	14	14	0	0	99
1889-90	67	55	17	6	0	6	151
1890-91	76	83	24	15	0	3	201
1891-92	86	63	28	19	9	3	208
1892-93	98	123	31	18	7	5	282
1893-94	36	103	71	21	5	4	240

The above shows that this year there have been sixty-two less enrolled in the preparatory department than during the previous year, and that forty more have been enrolled in the second year, and it will be seen also that there are twenty-two more in the college department than during the preceding year. This increase, under the financial stress, is a matter of congratulation. The small enrollment in the preparatory department is due to the fact that the board have excluded from that department all pupils from cities containing fifteen hundred inhabitants. This rule has proved very beneficial.

PRINTING.

For the past two years students have been admitted to a course in printing. The work is optional and does not relieve the student from work in any other course. This course prepares the student for a vocation, and is a means of culture as well. It furnishes excellent help to the study of English. There have been eight students in this department during each of the last two years. The printing office is a necessity for the work of the college. Here the catalogues, bulletins, circulars, programmes, blanks, etc., are printed. The editions of the bulletins for the past year have varied from 5,500 to 6,000. The estimated value of the work done in the printing department for the past two years is a follows: July 1, 1892, to January 30, 1893, value of printing, $1,876; July 1, 1893, to January 30, 1894, value of printing, $1,950. Besides furnishing a means of education for a number of students, this department has during each of these years proved a valuable investment for the college.

REPORT OF THE TREASURER.

To His Excellency, Sylvester Pennoyer, Governor of Oregon:—

SIR: We, the undersigned, being the special committee of the board of regents of the State Agricultural College, to whom was entrusted the duty of examining and reporting on the accounts of the treasurer, beg to report as follows:—

We have attended at the college and there examined the summary of receipts and expenditures on college account submitted by the present treasurer, Hon. J. K. Weatherford, but being in the main the result and summary of the accounts kept under the direction of the late treasurer, Dr. J. M. Applewhite, who died in May last. The books have been kept, and the accounts and vouchers, also, by the clerk of the board, Mr. H. R. Clarke, who has submitted the same to us with all needful explanations. We find the vouchers to correspond with the books. We report that the summary hereto attached correctly shows the receipts and disbursements on the college account, both of current income and also on the improvement fund account between the first day of July, 1893, and this day, the twenty-seventh day of June, 1894.

Very respectfully,

E. B. McELROY,
J. VOORHIES,
J. T. APPERSON,
Committee.

RECEIPTS AND EXPENDITURES.

The summary of receipts and expenditures were as follows.

COLLEGE ACCOUNT.

Income of college, July 1, 1893, to June 30, 1894.

RECEIPTS.		Amount.
Interest from land grant		$ 9,204 42
United States government		19,000 00
Farm and gardens	$748 20	
Miscellaneous	114 05	862 25
Tuition		1,892 50
		$ 30,959 17

DISBURSEMENTS.

	Amount.
Advertising and printing	$ 110 95
Current expenses	1,153 05
Freight, express, and drayage	116 60
Household economy	413 24
Institute	83 15
Library	81 60
Labor	873 05
Mechanical department	890 61
Machinery and tools	61 43
Miscellaneous (including subscription to association)	160 65
Repairs to heating apparatus	140 79
Postage, stationery, and telegrams	141 17
Printing department	862 83
Repairs and betterments	123 35
Traveling expenses	537 30
Salaries	21,915 05
Sanitary	483 10
Supplies	538 65
Scientific instruments	13 95
Wood for fuel	2,052 65
Meteorology	206 00
	$ 30,959 17

SUMMARY.

The summary of the improvement fund for the same period.

	Amount.
RECEIPTS.	
From the State of Oregon	$ 16,363 84
EXPENDITURES.	
By vouchers returned	12,586 85
Bank collections available	$ 3,776 99

REPORT OF THE EXPERIMENT STATION.

REPORT.

CORVALLIS, Oregon, January 7, 1895.

To His Excellency, Sylvester Pennoyer, Governor of Oregon:—

SIR: Under the provisions of section 5 of the act of congress, usually known as the "Hatch Experiment Station Act," we beg to submit to you the report of the operations of the Oregon Experiment Station for the years commencing July 1, 1893, and July 1, 1894, and also a report of the receipts and expenditures on station account during the financial year expiring the thirtieth day of June, 1894.

Very respectfully,

WALLIS NASH,
Secretary of the Board of Regents.

AGRICULTURAL EXPERIMENT STATION.

Report of the Special Committee of the Board of Regents at the annual meeting, held at Corvallis on Wednesday, June 27, 1894.

To His Excellency, Sylvester Pennoyer, Governor of Oregon—

SIR: We, the special committee appointed by the board of regents of the State Agricultural College, controlling the Hatch Agricultural Experiment Station connected with such college, to whom was referred the duty of examining and reporting on the accounts of the treasurer of such experiment station, and on the receipts and disbursements of the income of such station, beg leave to report: We have examined the accounts of the treasurer of such station and the vouchers presented by him. We have found such vouchers submitted to correspond with such books. We have examined also the summary of receipts and disbursements submitted by the treasurer, and which is attached hereto, and we find that such summary correctly shows the results of the operation of such experiment station for the financial year between the first day of July, 1893, and this twenty-seventh day of June, 1894, and to the thirtieth of June 1894.

Very respectfully,

E. B. McELROY,
J. VOORHEES,
J. T. APPERSON,
Committee.

RECEIPTS AND EXPENDITURES.

Summaries of receipts and expenditures on Experiment Station account, July 1, 1893, to June 30, 1894.

RECEIPTS.

By cash from United States government	$ 1,500 00

DISBURSEMENTS.

Bulletins	543 51
Botany supplies, etc.	208 30
Chemistry supplies	544 48
General supplies	327 44
Scientific instruments	51 65
Postage, stationery, and telegrams	73 25
Freight, expressage, and drayage	49 45
Fencing and drainage	186 50
Feed for stock	210 07
Greenhouse, repairs to heaters, pipes, etc.	350 00
Incidentals	193 15
Library	86 91
Labor	3,554 57
Miscellaneous	40 00
Livestock	229 00
Photography and photogravure	152 55
Repairs and betterments	250 50
Student labor on experiment grounds	130 00
Salaries	7,513 20
Tools and machinery	155 44
Traveling expenses	150 00
Total	$ 1,500 00

REPORT OF THE EXPERIMENT STATION.

Hon. Sylvester Pennoyer, President Board of Regents, Oregon State Agricultural College:—

Dear Sir: The work of the experiment station is a field of labor which is but little understood by those who are not connected with it, or who have not given the matter any sufficient thought.

An experiment involves the solution of a preceding hypothesis. The solution may involve the labor and observation of a day, a month, a year, or several years. Important experiments usually demand much time. Thus the experiments in wheat—the most valuable for the climatic conditions of Oregon—may require five years. Experiments with potatoes, strawberries, cabbage, etc., would likewise require years of time. Experiments with insecticides and fungicides alike require patience and the specialized knowledge of trained experts. The same is true in stock feeding, experiments in the culture of fruit, etc.

Besides this it is often found that hypothesis are not true, and hence the work done, in many instances, only aids in forming a new hypothesis. Hence, it is not possible to make plain all the work of the station, but results only can be shown. Yet there is no more important work done by the government for the people than that accomplished through the various experiment stations. The introduction of one variety of wheat, as, for instance, that known as No. 10, will in one year more than repay the expense of the station for ten years. The experiments in pig feeding show that an Oregonian can produce pork as fine in quality, and about as cheaply as can be produced in the great corn belts. This alone ought to be worth millions of dollars to Oregon. A like statement may be made of many of the other experiments. From the above it will be seen that the work of the experiment station cannot be adequately described.

During the past two years, ending June, 1894, there have been twelve bulletins issued, of which a synopsis is appended to this report. Since the station has been organized there have been thirty-one bulletins issued from the various departments. The number of each bulletin issued during the past year is 5,500, but the demands indicate that a much larger issue must be made for the coming year.

Below will be found a list of the bulletins issued by this station.

A star is placed before those numbers the edition of which has not been exhausted:—

Bulletin No. 1, October, 1888; History and Organization, by E. Grimm, 11 pages.

Bulletin No. 2, January, 1889; Horticulture, by E. R. Lake, 27 pages.

Bulletin No. 3, October, 1889; Entomology and Chemistry, by F. L. Washburn, 26 pages (P. H. Irish, 21 figures).

Bulletin No. 4, January, 1890; Agriculture, Horticulture, and Chemistry, 35 pages, 1 figure.

Bulletin No. 5, April, 1890; Chemistry, by P. H. Irish; Entomology and Zoölogy, by F. L. Washburn, 31 pages, 13 figures.

*Bulletin No. 6, July, 1890; Chemistry, by P. H. Irish; Zoölogy, by F. L. Washburn, 16 pages.

*Bulletin No. 7, October, 1890; Small Fruits and Vegetables, by G. Coote, 12 pages.

*Bulletin No. 8, January, 1891; Varieties of Wheat and Flax, by H. T. French, 17 pages.

Bulletin No. 9, February, 1891; Silos and Silage, by H. T. French, 8 pages.

*Bulletin No. 10, April, 1891; Entomology, by F. L. Washburn, 34 pages.

Bulletin No. 11, May, 1891; Grasses and Potatoes, by H. T. French, 23 pages, 2 plates.

Bulletin No. 12, May, 1891; Strawberries, by G. Coote, 9 pages.

Bulletin No. 13, May, 1891; Chemistry, by G. W. Shaw, 8 pages.

Bulletin No. 14, May, 1891; Entomology, by F. L. Washburn, 14 pages, 4 figures.

Bulletin No. 15, January, 1892; Horticulture, by G. Coote, 16 pages.

Bulletin No. 16, February, 1892; Varieties of Wheat, by H. T. French, 9 pages, 1 plate.

Bulletin No. 17, February, 1892; Sugar Beets, by G. W. Shaw, 32 pages, 5 plates.

Bulletin No. 18, March, 1892; Entomology, by F. L. Washburn, 16 pages, 14 figures.

Bulletin No. 19, May, 1892; Oregon Weeds, by M. Craig, 48 pages, 19 plates.

Bulletin No. 20, September, 1892; Pig Feeding, by H. T. French. In this bulletin a report was made upon experiments in feeding three lots of pigs. The object of the work was to test the value of whole grain and ground grain fed separately, as compared with a mixture of the same kind of food. Lot 1 was fed ground oats and wheat, given to the pigs seperately; lot 2, whole oats and wheat, fed separately; lot 3, mixture of ground oats, wheat, barley, and shorts.

Cuts of meats were shown in connection with the notes. This bulletin contained 16 pages and 4 plates.

Bulletin No. 21, October, 1892; The Soils of Oregon, by G. W. Shaw. There is given in this bulletin a statement of opinion regarding the value of soil analysis; general information relating to soil formation and composition; and Hilgard's minimum hints of fertility for the various soil ingredients. There is also given an outline of the topography of the State, and comparative and tabulated analyses of twenty-eight characteristic Oregon soils, mostly from the Willamette Valley, together with the natural vegetable, and the physical, properties of each sample. This bulletin was intended to be the first of a series on the same subject, and no definite conclusions could be reached from so small a number of analyses; but, so far as the soils treated in this bulletin are concerned, there was a rather low percentage of potash for the valley soils, and a rather low percentage of phosphoric acid for the soils from Eastern Oregon. The edition of the bulletin is exhausted, but it has been reprinted in the biennial report of the Oregon Weather Bureau, and in the last annual report of the State Horticultural Society.

Bulletin No. 22, January, 1893; Horticultural Department, by George Coote. It contains comparative tests of small fruits and vegetables, with notes on the comparative value of different varieties; also, directions for pruning and renovating old orchards. This bulletin conveys the results of four years of experimental work.

Bulletin No. 23, February, 1893; Sugar Beets in Oregon, by G. W. Shaw. A continuation of the experiments begun in 1891 is described in this bulletin, which also embraces a résumé of the work done in that year. The bulletin contains comparative climatic tables showing the conditions under which the experiments were conducted. A summary of the analyses for 1892 shows an average for the State of 15.70 per cent sugar, with a purity of 78.08 per cent, against 13.75 per cent, and a purity of 77.57 per cent for 1891. Out of sixty-five samples analyzed in 1892, only eleven samples showed less than 12 per cent sugar, and forty-one gave over 14 per cent sugar, the extremes being 9.4 per cent and 23.80 per cent. Some of the conclusions reached are: First, good sugar beets can be produced in Oregon; second, they can be produced at a price which a factory can afford to pay; third, the yield compares favorably with that of other States now raising beets for the manufacture of sugar; fourth, large beets do not contain so large a percentage of sugar as small beets, and the purity is less; fifth, beets could be profitably substituted by the farmerfor bare fallow.

Bulletin No. 24, March, 1893; Potatoes and Roots, by H. T.

French. This bulletin contains a report upon the testing of fifty-nine varieties of potatoes as to yield, date of ripening, manner of growth, etc. Results of fertilizer tests upon potatoes are also given. Tests of thirteen varieties of carrots and eleven varieties of roots are reported in this bulletin. A short table is published in connection with this bulletin, showing composition of corn silage, and seven varieties of roots. The bulletin contains 12 pages.

Bulletin No. 25, April, 1893; by F. L. Washburn, gives a report on further work with the codlin moth and the hop-louse, and resulting recommendations to farmers and orchardists. The same bulletin contains a treatise on work done against gophers and moles; and various traps, guns, and other remedies were discussed, and some recommended. Bulletin contains 24 pages, 3 plates and 13 figures.

Bulletin No. 26, January, 1893; Drainage, by John M. Bloss, Director. 1. Necessity of drainage. 2. The purpose. 3. How water enters the tile. 4. The change effected in the character of the soil. 5. How to lay the tile; objectional methods; better methods; each represented by diagrams. 6. How deep. 7. How far apart. The edition of this bulletin is exhausted. It has been published in the report of the State Board of Horticulture for 1893, pages 225 to 236.

Bulletin No. 27, December, 1893; Botanical Department; Cause and Prevention of Plant Diseases, by Moses Craig, 31 pages. A popular account of common plant diseases, with the best means of prevention, illustrated by 23 figures; how to spray, apparatus needed, and mixtures used; when to spray; general hygenic treatment; special treatment of certain diseases, as scab, blight, rusts, and smuts, mildew, etc.

Bulletin No. 28, January, 1894; Continuation of Pig-feeding Experiments, by H. T. French. This bulletin contains the results of two experiments. Experiment No. 2 shows the results of feeding a single kind of grain as compared with a mixture. Four pigs were used in the experiment. Experiment No. 3 was conducted for the purpose of testing the results of wet food for pigs against dry food. There is a slight difference in favor of wet food. Half-tone cuts of the meat are shown in both cases. The bulletin contains 14 pages and 4 plates.

Bulletin No. 29, February, 1894; Horticultural Department, 50 pages, 6 figures, by George Coote. Notes on vegetables, fruits, and pruning. Notes on the comparative earliness and value of different varieties of cabbage, kale, celery, tomatoes, grapes, peaches, and strawberries; also directions for pruning the plum and prune. Bulletin contains 18 pages and 4 plates.

Bulletin No. 30, April, 1894; Potatoes and Roots, by H. T. French.

One hundred and fifty-three varieties of potatoes are reported upon in this bulletin. The yield per acre of eighty-eight varieties are given, also whether they are early, medium, or late. Fourteen varieties of mangells, three varieties of carrots, and three of rutabagas are also described. Cuts of thirteen varieties of carrots are presented in this report. Bulletin contained 10 pages, 2 plates, and 1 figure.

Bulletin No. 31, April, 1894; Report of Work in Entomological Department, by F. L. Washburn. Codlin Moth, Hop-louse, Flea Beatles, Cutworms, Wireworms, Radish Flies, and Tent Caterpillars. Illustrations of some Oregon insects and their work — Gophers and Moles. Outline of work with results and recommendations.

Article 2, Capons and Caponizing. Report on results of experiments made on caponizing cockerels, showing gain of capon over cockerel. The operation described, etc.

FARMERS' INSTITUTES.

The following institutes have been held during the past two years:—

At Milton, September 28–30, 1892; Newberg, Yamhill County, and Brownsville, Linn County, November 24–25, 1892; Dufur, Wasco County, February 24–25, 1893; Barlow, Clackamas County, February 24–25, 1893; Siuslaw, Lane County, May 19–20, 1893; Oakland, Douglas County, November —, 1893; Hillsboro, Washington County, November —, 1893; Corvallis, Benton County, January 10th and February 17, 1894. In addition to this, help has been given to horticultural meetings, county and State, whenever it has been possible. It has been the plan and purpose of the station council to hold an institute at any point where there was a desire for such a meeting, and where there was sufficient local interest to bring the agriculturists and horticulturists together.

RECOMMENDATIONS.

Besides improvements which have already been suggested, I feel that especial attention ought to be called to the necessity for a dairy. The last legislature was asked for an appropriation of $2,000 for this purpose, but it was omitted from the bill. This is a line of work — educative work — which should be directly connected with the college. Besides, it is a kind of work which should be sustaining.

The opinion that the student learns from, and is influenced only by, that "Course" which he pursues in the college, is far short of the truth. The mechanical student will make a better agriculturist and horticulturist because of his contact for four years with that kind of work; the agricultural student is interested in the work of the mechanical student.

The same would be true of a dairy — every student attending the institution would get much of value to carry to his home, and to benefit him throughout life, although he may not have made that work a special study.

SYNOPSIS OF THE SPECIAL REPORTS.

From Professor H. T. French, Agriculturist to the Station: —

President John M. Bloss, Director of Experiment Station —

DEAR SIR: I herewith submit a brief report of work in the agricultural department of the station during the past two years.

During the year the time has been taken up in carrying on the experiments noted in the last biennial report.

First among the experiments, and one of the most important to the farmers, is that of feeding pigs, owing to the fact that wheat has been selling for such a low price that no profits could be realized from it, unless it could be converted into meat products. This experiment proved especially fortunate.

It will be observed in bulletin No. 28, that pork products can be profitably produced from feeding wheat, oats shorts, and bran; such products as can be grown in Oregon. The making of economical combinations of the food products of Oregon, is left for further investigation.

Much experimentation is needed along this line, that the best results may attend the work. It is quite as important to know how to feed as to know what to feed.

Much work is needed to determine the best methods of feeding cattle for market. The day of range-fed beef is fast passing away, and stall-fed beef is growing in demand. To assist in demonstrating that beef can be profitably fed in the State, will be one of the objects in future feeding experiments.

Some two hundred varieties of potatoes were grown in plats last year. Notes were taken and results published in bulletin No. 30.

We sent out over one thousand one-pound packages of seed potatoes last spring. In many cases the results obtained from the varieties were very flattering. As much as one hundred and fifty pounds of potatoes were grown from a single pound of seed. In this way farmers are enabled to reap great profit from the experiment station work, and at the same time assist us in determing the most valuable varieties.

Forty plats of grasses and clovers were put out last year, and nearly all have made a good stand. Results of this work will appear in future bulletins.

A few roots of the noted forage plant (*Lathysus sylvestris*), were obtained of the experiment station of California in 1893. These roots have grown finely, showing that the plant is well adapted to our soil and climate. Seed was obtained last spring and we now have quite a large plat started. From results reached in other places, we are led to think that this plant will be a most valuable acquisition to the list of forage plants, for the drier portions of the State. It is said to succeed remarkably well in foreign countries, on hill land similar to that of Oregon.

Fertilizer tests are now in progress on wheat, potatoes, roots, and corn. There is a growing interest in the use of commercial fertilizers in the State; and we shall hope to be able to furnish some reliable data upon the practical application of these manures.

In our last report mention was made of clover tests upon white land. Where the land is well drained there is no difficulty in growing clover successfully. The yield of clover last year from a field containing twenty acres of partially white land was three and one half tons per acre. The growing of clover has ceased to be an experiment with us; it is a reality. Clover can be grown on all of the higher pastures of the Willamette Valley, without doubt, if the ground is placed in proper condition for the seed.

Eighty varieties of wheat were grown in plats last season. Samples of three varieties have been distributed among the farmers of the State for trial. From returns received these varieties promise to excel the old and somewhat run-out varieties. Two hundred packages of this wheat was sent out for trial.

The silos built in the new barn are very convenient and prove satisfactory in every particular.

Aside from planing and superintending the experiments briefly alluded to in this report, I have had a general supervision over the work of the college farm. I have attended and taken part in the programme of Farmers' Institutes held at Hillsboro and Oakland, the only institutes held during the year. Three and one half hours have been spent daily in the class room and college work.

WORK NOT YET PUBLISHED AND CONTEMPLATED WORK IN THIS DEPARTMENT.

1. Steer-feeding experiments in testing the value of corn silage and chopped wheat compared with hay and grain.
2. Pig-feeding on forage plants. (*a*) Winter vetch; (*b*) clover.
3. Plat experiments in testing grasses and clovers.
4. Testing forage plants. (*a*) Flat pea (*Lathysus sylvestris*); (*b*) rape; (*c*) Kaffin corn and Jerusalem corn; (*d*) crimson clover; (*e*) millet; (*f*) winter vetch.
5. Fertilizer tests. (*a*) Potatoes; (*b*) wheat; (*c*) corn.
6. Testing varieties. (*a*) Potatoes; (*b*) mangels; (*c*) carrots; (*d*) corn; (*e*) spring grains.

Finally, I wish to thank you, Mr. President and Director, for the cordial manner in which you have coöperated with me in furthering the interests of the agricultural deprrtment of the station and college.

CASH RECEIPTS OF FARM FROM JULY, 1893, TO JULY, 1894.

Produce.	Amount.
125 pounds butter @ 25c	$ 31 25
169 gallons milk @ 15c	25 40
5 bushels vetches @ $1.50	7 50
188 bushels wheat	78 70
15 bushels potatoes @ 35c	5 25
3¾ tons of hay	30 65
2 fat calves	16 50
368 bushels potatoes @ 25c	92 00
1,154 pounds beef @ 3¼c	135 00
550 pounds beef @ 2½c	13 75
1,001 pounds pork @ 6c	60 14
100 pounds hay @ 1c	1 00
1 bushel wheat	50
Sow and pigs	40 00
4 fat steers, on foot	100 00
Bull service	3 00
6 pigs, on foot	50 45
86 pounds wool @ 10c	8 60
1 pig	5 00
Silage cutter	20 00
Total cash received	$ 721 79
320 gallons milk to Mr. Moore @ 15c	543 00
Total	$ 1,267 79

Total products of the farm from July, 1893, to July, 1894:—135 pounds of butter, 3,939 gallons of milk, 570 bushels of potatoes, 14 tons 1,700 pounds of roots, 108 tons of corn silage, 224 bushels of oats, 428 bushels of wheat, 69 tons of hay.

Very respectfully,

H. T. FRENCH, Agriculturist.

From Professor George Coote, Horticulturist to the Station:—

President John M. Bloss, Director of Experiment Station—

DEAR SIR: In addition to the work already reported on, there was, during the past biennial term, a further trial of fall-planted cabbage, consisting of eight varieties, all of which were claimed to be early in maturing. Early Etapes proved to be the first to mature of the eight varieties tested, being five days in advance; Early Summer the second, Jersey Wakefield the third.

CELERY.—Tests were made with four varieties for the purpose of proving earliness, hardiness, and quality. For early use, Golden Yellow proved to be excellent; White Plume, second. Solid Ivory is well suited for late use, as it stands well through the winter months.

KALE.—Notes were kept on nine varieties, which proved to be of great value, supplying a great quantity of green vegetables late in spring. Varieties found best suited to this climate were as follows: Fall Scotch, Extra Early Curled, and Dwarf German.

BEANS.—Tests were made with eight varieties—three of which were Limas—of which none matured seeds. Early Golden Cluster proved to be of great value, being both handsome and productive.

TOMATOES.—Four varieties were received from different seedsmen for trial, namely: Thornburn's Terra-cotta, Lemon Blush, Atlantic Prize, and Early Michigan. Atlantic Prize proved to be valuable on account of its earliness; Terra-cotta being a good second early.

STRAWBERRIES.—Comparative notes were made on forty-eight varieties during the year. Report on each variety will be found in bulletin No. 29.

ORCHARD.—The varieties of fruit trees in the experimental orchard are doing well; a few have commenced to produce fruit. Owing to the late frost in the spring of 1894, the blooms were cut so badly that but few set. Prunes (*Simonii*) fruited last season, but did not prove of very great value. Keswick Codling apple also fruited, and proved to be highly productive, and valuable for cooking purposes. In the experimental orchard the following varieties of fruit are growing: Apples, 29; pears, 32; peaches, 11; crabs, 4; plums, 5; grapes, 32, making a total of 113 varieties growing in experimental orchard.

GRAPES.—Eight varieties have fruited so far. Green Mountain has given best results as a white grape, being very early to mature, and of good quality.

PEACHES.—The orchard planted in 1889 consisted of about forty varieties. Not one has proved to be of any value, being each year injured by curl-leaf so much that the greater number of them have died. Those remaining should be removed, and further experiment made in a different location. During the winter of 1894 experiments were made to prevent curl-leaf by spraying with the lime, sulphur, and salt mixture, and the result shows an improvement of 50 per cent over those not sprayed. In the month of November three varieties of the peach that had been badly affected for four years by curl-leaf were taken from the orchard, planted in half-barrels, placed in the cool greenhouse, and a correct record kept as to temperature, morning, noon, and night. Each tree has made good growth, without the least trace of curl-leaf. The trees were placed in the greenhouse in order more closely to study the cause of the disease. Report on this experiment will be given in a future bulletin.

During the early spring notes have been taken on all the varieties of pears, apples, cherries, and plums already set out, with a view of ascertaining those varieties that are the greatest pollen-producers, also the date of blooming and date of fertilization, for the purpose of classifying each variety in regular order, so that a better understanding may be gained in methods of planting orchards. It is essential to know those varieties that are productive of pollen, those which bloom at the same time, and those which are sterile, in order that the pollen-producers may better fertilize those that are sterile.

Hops.— In the spring of this year one acre was planted on the experimental grounds for the purpose of future experiments. The plants are making good growth, and promise well.

EXPERIMENTS NOW IN PROGRESS.

Comparative notes on, and the testing of a number of novelties in vegetables, in the order mentioned: cabbage, 8 varieties; cauliflower, 4; radish, 6; celery, 6; tomatoes, 3; lettus, 7; beets, 6; beans, 12; onion, 1; pease, 13; squash, 5; cucumber, 3; watermelon, 2; muskmelon, 2; spinach, 4; leek, 1; total 87 varieties. Cucumber experiment has been commenced in growing the cucumber in the small hothouse, for the purpose of determining whether or not by that method of cultivation they can be made profitable in Oregon, when grown under glass. The varities are of a much larger kind than the common pickling cucumber.

Strawberries.— Notes are being kept on several varieties. This is in continuance of the work already reported. New additions to the collection will be made during the year; also notes on a large number of small fruits, such as blackberries, gooseberries, currants, raspberries, and serviceberries.

Further experiments will be made with the different fungicides during the year for the prevention of curl-leaf on the peach. Experiments in cross-fertilization will be made. For this purpose I have several varieties of fruit trees planted in boxes so that they may be placed in the greenhouse, where the work may be carried on with better success, as it is impossible to carry on the work outside at the season of the year when heavy rains and late frosts interfere.

Hops.— Experiment will be made with several fertilizers, and the different methods of cultivation and training of the plant.

PRODUCTS SOLD FROM SEPTEMBER, 1893, TO JUNE, 1894.

Cash received for produce during the year and paid over is as follows:—

October 31, 1893	$	63 25
November 20, 1893		26 80
December 11, 1893		20 00
January 19, 1894		24 00
Total	$	114 05

GEORGE COOTE, Horticulturist.

From Professor F. L. Washburn, Entomologist to the Station:—

President John M. Bloss, Director of Experiment Station—

Dear Sir: At your request I hand you herewith a report of work for the past two years in the entomological department of the station.

Institutes Attended.— Six Farmers' Institutes have been attended by the entomologist where papers on insect pests have been presented. Communications have also been sent to the press at various times during the year.

World's Fair Exhibit.—The department exhibited at Chicago a spraying outfit belonging to the station, with large photo illustrating its use in orchards, a glass breeding cage used by the department, and three cases of mounted Oregon insects. All this property has been safely returned and the three cases of insects now form a feature of the zoölogical museum.

Correspondence.—About two hundred and fifty letters of inquiry regarding insect pests have been answered.

WORK PROPOSED.—1. Combined experiments by the botanist and entomologist to demonstrate the value of a combined fungicide and insecticide, directed against the apple scab and insects affecting the apple and the pear.

2. Experiments against various forms of plant lice, including the hop-louse.

3. Experiment to test the value of kainit and muriate of potash (when broad-casted) against cutworms and wireworms.

4. Experiment with Koebele's Resin Wash, to see whether it may be used weak enough to be harmless to beneficial insects, while at the same time it will kill the tender-bodied plant lice amongst which the beneficial insects are found.

5. A known number of "weevily" pease (700) have been planted to determine what proportion of seed thus injured will germinate. The formed pods on those which will come up will be sprayed with some repellant to keep, if possible, the beetle from laying eggs thereon.

6. If possible it would be advisable to keep at the station a flock of capons with roosters as checks. In this way the results of caponizing would be more easily seen and demonstrated than when a few birds, which are private property, are used.

7. The entomologist holds himself ready at all times to impart to farmers and orchardists all information possible lying within his province and to unite with them in quelling any unlooked for uprising of insect pests.

Respectfully,

F. L. WASHBURN, Entomologist.

From Professor Moses Craig, Botanist to the Station:—

President John M. Bloss, Director Experiment Station—

DEAR SIR: I herewith submit the following report: The constant endeavor has been to build up the department and increase its efficiency. Careful records have been kept of work accomplished, as well as work in progress. Two bulletins have been published, No. 19, on "Some Oregon Weeds and How to Destroy Them," and No. 27, on "The Cause and Prevention of Plant Diseases."

A large number of letters asking information about medicinal, weedy and poisonous plants, plants best adapted to certain locations, various grasses, the cause, prevention and cure of various plant diseases, etc., have been received and answered. These have been carefully filed, together with copies of answers returned.

As all botanists know, much of the work done in improving an herbarium is seen only on close inspection. Our herbarium has been built up both by collections and exchange, the old cases extended, 100 new shelves added, and the entire collection rearranged and labeled according to recent botanical nomenclature. It is now the best college collection in the State. Number of species in herbarium, 5,013; phanerogams, 2,659; cryptogams, 2,354; new plants added to herbarium, 1,790; plants identified for farmers, 260.

During the summer vacation I have collected a large number of specimens, with many duplicates for exchange with other botanists. For example, a large number of weedy plants was sent to Professor Halsted, and many grasses to Professor Tracy. A large number of specimens received in exchange remain unmounted for lack of paper. Imperfect specimens have been improved and many doubtful determinations have been changed or verified. Specimens of the most injurious and obnoxious weeds, the characteristic grasses, economic fungi, and some typical plants of the State were collected and sent to the committees appointed by the Association of Experiment Stations for the Columbian Exposition.

The following is the outline of work proposed in this department:—

1. To continue the work begun in bulletin No. 19, on the weedy and poisonous plants of the State.

2. To continue the work on plant diseases begun in bulletin No. 27.

I am now carrying on, in connection with the entomologist, a series of experiments in the station orchard, on the effect of a combined fungicide and insecticide.

3. To make a study of the clovers, grasses, and forage plants of the State in coöperation with the chemist. This work was begun last year but from unforseen causes much will have to be done over again. The native clovers will be taken up first, as they present a fine field for original investigation.

4. A study of forest conditions; first, with the view of preventing the great waste of timber from forest fires; and, second, to introduce tree culture in the eastern part of the State.

5. To make a collection for the herbarium of as many specimens of Oregon plants as possible and by exchange to increase the working collection from other States.

6. To collect as many species and forms of parasitic fungi as possible, preparatory to cataloguing the rusts and mildews of the State. A large quantity of specimens have already been collected.

The above work will require a number of years for its completion, and other lines may be taken up simultaneously with these as occasion requires.

Respectsully submitted.

MOSES CRAIG, Botanist.

From Mr. John Fulton, Acting Chemist to the Experiment Station: —

President John M. Bloss, Director of Experiment Station —

DEAR SIR: I have the honor to submit the following report on the work done in the chemical laboratory of the experiment station since January 12, 1892:

Prior to the change of officers of this department a synopsis of the lines of investigation was laid out by Prof. G. W. Shaw, the officer then in charge, embodying the following experiments —

(*a*) Extended investigation concerning the chemistry and physics of alkali soils.

(*b*) The best methods of improving these soils.

(*c*) Experiments to determine the chemical valuation of the various cattle foods of the State..

(*d*) A thorough chemical study of the grasses and clovers of the State.

Carrying the soil experiments as far as possible with the material on hand, Professor Lotz — successor to Professor Shaw — with my assistance, entered upon the determination of carbon hydrates in different grasses, results of which are to be issued in bulletin form after an extended series of experiments have been made.

Another line of work — not before contemplated — was the analysis of commercial fertilizers; but as the law does not provide for the exposition of analysis, except of those samples which are sent by the food commissioners, we are not authorized to make publication of the work.

During the and fall summer of 1893 a collection of the native clovers was made with a view to determine their food value with cultivated clovers. Results of these experiments will also be published in bulletin form.

Towards the close of last summer Professor Lotz suggested the idea of determining the amount of the different ingredients taken from the soil by different varieties of pears, apples, and prunes, and accordingly sent out about seventy-five letters requesting the recipient to forward several samples of fruit, together with the soil upon which they were raised, for the purpose of investigation in this line. The importance of these determinations was not apparant to many orchardists, as only few complied with his request.

From different portions of the State, and from some adjoining States, many samples of ores and water have been sent for analysis, all of which have been completed, and are to be found under the head of miscellaneous work.

Below, in tabulated form, the number of analysis made for the food commissioner is given: —

	Number of analyses made.	Estimated cost of analyses.
Analyses of milk	24	$ 120 00
Analyses of butter	2	16 00
Analyses of fat	2	20 00
Analyses of cheese	4	60 00
Analyses of coffee	3	30 00
Analyses of tea	2	20 00
Analyses of flour	2	30 00
Analyses of mustard	2	20 00
Analysis of pepper	1	10 00
Analysis of buckwheat	1	15 00
Analyses of lard	2	30 00
Total for food commissioner	45	$ 371 00

In miscellaneous work, the following has been done: —

	Number of analyses made.	Estimated cost of analyses.
Analyses of clay	2	$ 20 00
Analyses of condensed milk	4	48 00
Analyses of green pease	4	60 00
Analysis of honey	1	30 00
Analyses of syrup	2	60 00
Analyses of bread	2	40 00
Analyses of mineral water (qual.)	6	60 00
Analyses of ores	3	15 00
Analyses of butter	6	60 00
Analyses of coal	4	80 00
Total miscellaneous work	34	$ 473 00

For which the department has received no remuneration, with the exception of one case.

In the line of laboratory work, the following analyses has been made: Analyses of feeding stuffs, 7; analyses of slag for fertilizer, 2; analyses of fruit, 5; analyses of ashes, 8; analyses of soils, 18; analyses of fertilizers, 13; analysis of kelp, 1; analyses of beets, 4; total, 58. Total number of analyses made from January, 1892, to June 15, 1894, is 137.

Regarding the intended lines of work for investigation I beg leave to state that it is the purpose and intention of this department — .

(*a*) To conduct an extended series of experiments to determine the effect of certain fertilizers upon different field and garden products.

(*b*) To extend the work in analyses of fruits and the soils upon which they grew.

(*c*) To continue experiments to determine the food value of the native grasses and clovers, and also of the cultivated varieties.

Considering the amount of miscellaneous work continually received at the laboratory, added to the regular line of work, we have ample employment for nearly all the ensuing year.

Respectfully yours,

JOHN FULTON, Acting Chemist.

From Professor E. F. Pernot, Photographer to the Station:—

President John M. Bloss, Director of Experiment Station—

DEAR SIR: I herewith submit the following report of work completed by the department of photography and engraving since the report of 1893.

During the past year new and commodious apartments have been provided for the efficient execution of this work. Though they are but partially equipped, they have been the realization of a long-felt necessity.

TEACHING THE ART AND SCIENCE OF PHOTOGRAPHY.—In the college, photography is taught as an elective study to those who are in the third and fourth year's work. Two classes have been taught this science, one primary and one advanced, the latter having received a general practical knowledge of the art. One student, a post-graduate, has taken a nine months, special course in the art of newspaper illustration.

ENGRAVING.—The following engravings have been made within the past two years for illustrating the several bulletins issued by the station, also the college catalogue and other illustrations which were deemed necessary. Total number of engravings, 70, representing a commercial value of $385. The demand for illustrations in the bulletins is increasing, and these illustrations are indispensable features for the college and station. The greater portion of these engravings are half-tone photogravings from photographs of the experiments made, and the remaining portion are line-engravings from pen and ink drawings.

PHOTOGRAPHS.—Photographs were taken of all the important experiments, and methods of treating plant diseases, thus giving a correct record of the experiments. Lantern slides were made from photographs necessary to illustrate lectures at the Farmers' Institutes, giving the public a more comprehensive idea of the statements made. In connection with this, lantern slides have been made of all the college buildings and accessories, thus giving the public a broader knowledge of the work the institution is doing.

PHOTO-MICOGRAPHY.—This is by no means an unimportant branch of the work done in this department. In revealing the adulterations of foods sent to the experiment station, the photo-micrograph is an important factor, as it gives a true reproduction of the sample. The micrograph is one of the means by which the development of plant diseases may be studied under different conditions, and the destructive work of insects carefully reproduced for reference. This very important work should be thoroughly considered, and, as far as possible, the necessary appliances should be provided for the proper execution of the work.

Respectfully submitted.

E. F. PERNOT, Photographer.

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1908/09

SERIES 1. ISSUED MONTHLY No. 39

BULLETIN

OF THE

Oregon Agricultural College

STATE OF OREGON
1859

ANNUAL REPORT

OF THE

President of the Board of Regents

1908-1909

JUL 19 1962

Entered at the postoffice, Corvallis, Oregon, as second-class matter, under Act of Congress, July 16, 1894

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SALEM, OREGON
WILLIS S. DUNIWAY, STATE PRINTER
1910

OREGON AGRICULTURAL COLLEGE

ANNUAL REPORTS

1908-1909

Hon. Frank W. Benson,
Governor of the State of Oregon:

I have the honor of submitting the Annual Report of the Board of Regents of the Agricultural College of the State of Oregon.

The work done and the results obtained in the past and esspecially the splendid work of the year closing July 1, 1909, is exceedingly encouraging to those having in charge the government and control of the institution.

The increase in attendance as well as the growth and broadening of its field of usefulness and the assistance rendered in the development of the material resources of the State, as well as the training of our young people along useful, practical and industrial lines, has appealed very strongly to the public. During the year just closed, the registration was thirteen hundred and fifty-one (1351); for the year ending July 1, 1908, the attendance was eleven hundred and fifty-six (1156).

On June 16, 1909, there was graduated a class of one hundred and twenty-one young people, who were recommended by the President and Faculty of the institution to be proficient in the various industrial pursuits as well as in a general scientific course usually taught in the higher schools of learning, who we trust will be of some benefit to the State at large by giving an increased impetus to the various industrial avocations and thereby repay the people of the State for the money expended in their behalf.

The capacity of the institution for taking care of the large number in attendance has been taxed to its limit. An appeal was made at the last session of the legislature for money to construct other needful buildings, and appropriations were made for that purpose. The Board of Regents is proceeding as rapidly as possible to secure the additional buildings and additional grounds so as to extend the usefulness of the institution, as contemplated by the legislature.

A complete and itemized report of the attendance, the financial condition, salaries of employees, and the graduating classes as especially provided for by law, to be included in the report of the Governor, are all contained in the report of President W. J. Kerr, which is hereto annexed and made a part of this report, and I refer to the same for the information usually contained in the report of the President of the Board of Regents.

EASTERN OREGON EXPERIMENT STATION.

The Eastern Oregon Experiment Station, stationed at Union, Oregon, is making good progress and has accomplished much work that is of scientific and practical value to the farmers, especially of that section of the State.

The work has been confined to the production of vegetables, cereals, grasses, forage plants and horticulture and the testing of soils. Some experiment work has been done in connection and in cooperation with the Department of Agriculture of the United States in testing dry land alfalfa. Some of the experiments have been and are being made at the Station Farm, some at Hot Lake and some at Haymo Flat, the latter being at an elevation of 3,600 feet. Many varieties of this forage plant are being tested at these places as well as a large number of other grasses, endeavoring as best we may to secure a grass that will suit the range conditions of Eastern Oregon. The work is under the supervision of Robert Withycombe.

Five acres of the farm has been set aside for vegetable garden, two acres for apples, one and one half acres for pears and one acre for small fruits.

The work at this station has done much good in the line of demonstrating the agricultural and horticultural possibilities of the eastern section of the State, and as we believe has repaid the State several times over for all the expenditures that have been made for its equipment and maintenance.

The legislature in 1909 appropriated fifteen thousand dollars ($15,000) for the maintenance of this station for the two years following.

The receipts and expenditures for this station from July 1, 1908, to July 1, 1909, as reported by the business office of the College, are as follows:

RECEIPTS

Balance 1907–8	$ 2,647 58	
Received from Secretary of State	5,625 00	
Transferred from station funds, La Grande	808 25—	$ 9,080 83
Expenditures		8,726 48
Balance		$ 354 35
Sales of produce turned to Treasurer		$ 2,703 10

HERMISTON BRANCH STATION.

At the meeting of the Board of Regents on January 6, 1909, the Board authorized the establishment of a sub dry land station to be established in connection with the Federal Government, at or near the town of Hermiston in Umatilla

County. The legislature passed an act approved February 23, 1909, appropriating three thousand dollars ($3,000) annually for the purpose of assisting in maintaining and supporting the said station, the conditions being that the Federal Government appropriate a like amount and furnish the land properly fenced and cleared and furnished with an adequate supply of water for domestic and irrigation purposes, with necessary laterals, permanent improvements and initial equipments, without cost to the State of Oregon, and to the satisfaction of the Board of Regents of the Agricultural College.

The bill further provided that the sum of money appropriated should become available at any time, a like amount being available from the Federal Government, if the land described should be properly fenced and cleared and furnished with an ample supply of water for domestic and irrigation purposes, with necessary lateral and permanent improvements, without cost to the State of Oregon. The fund so appropriated to be used by the Board of Regents for the purpose of maintaining and supporting an experiment station for agricultural experiments in Eastern Oregon and for providing scientific apparatus and tools for tilling and improving the land, and for all other necessary purposes for conducting and developing experiments in Eastern Oregon, including the preparation and publication of reports of the work accomplished by said station. The work has been undertaken under the provisions of said act by the Board of Regents.

In May, 1909, Mr. R. W. Allen was appointed as superintendent of said branch station and entered upon his duties. Mr. Allen had been Assistant Horticulturist at Corvallis, since his graduation at the College in 1907. He is not in a position as yet to make a report of the work done.

On May 15, 1909, Mr. Herbert D. Newell, in charge of the Government reclamation work on the Umatilla Irrigation Project, reported that permanent improvements had been made on the forty acre experimental farm as follows:

Cottage for superintendent	$ 1,298 97
Office	299 09
Barn	353 94
Fence around farm	364 71
Well	67 57

Other improvements which are under way, with the necessary initial equipment, would bring the total to approximately $3,000.00.

We hope to be able to report excellent success from this institution in the near future.

DRY-LAND EXPERIMENT STATION.

On February 17, 1909, the State legislature passed a law appropriating twenty-five hundred dollars ($2,500) annually for the conducting and maintaining of an experiment station of the State Agricultural College on dry, arid or non-irrigated lands in the State of Oregon. The act of the legislature in substance provides as follows:

"That in order to investigate and demonstrate the conditions under which useful plants may be grown on dry, arid or non-irrigated lands of the State of Oregon, and to determine the kinds of plants best adapted for growth on these lands, there be and hereby is established in the manner in this act provided, an experiment station in the State of Oregon for that purpose.

"That said station shall be located on such part of dry, arid or non-irrigated lands of the State of Oregon, by and under the direction of the Board of Regents of the State Agricultural College of the State of Oregon, as shall be selected by the Board of Regents of said College, acting in cooperation with a representative of the United States Department of Agriculture; that the station shall be under the management and control of the Board of Regents of the State Agricultural College of the State of Oregon as a branch station.

"That the appropriation called for by the terms of this act shall not be available until the necessary land, permanent improvements and initial equipment are conveyed without cost to the State of Oregon, the lands to be selected by the Board of Regents of the Oregon Agricultural College acting in cooperation with a representative of the United States Department of Agriculture, the United States to expend the sum of $2,500 annually, being a like amount with the State of Oregon to assist in maintaining and supporting said station.

"That the Board of Regents shall cause to be prepared and published, complete annual reports of the work undertaken and accomplished by said station."

On July 1, the committee appointed to make investigations of the conditions in different dry land counties regarding sites for locations of this station had not yet completed their investigations or filed their report.

BULLETINS.

During the past year a number of station bulletins were issued, covering various subjects connected with the work of the station, the total aggregate in pages of published material being two hundred and sixteen, of which ten thousand were mailed to the residents of the State of Oregon. Any person desiring the bulletins will be supplied with them free of cost on furnishing to the station their name and address. These bulletins contain much valuable information, especially to people engaged in any of the industries treated of, and the range of the bulletins is so wide that they cover nearly all of the industries in which our people are engaged.

I call attention to the report of the directors of the station filed herewith.

Respectfully submitted,
J. K. WEATHERFORD.
President of the Board of Regents.

ANNUAL REPORT OF THE PRESIDENT

Hon. J. K. Weatherford, President, Board of Regents,
Oregon Agricultural College and Experiment Station.

Sir: In accordance with a regulation of the Board of Regents, the President of the College has the honor to submit his report for the year ending June 30, 1909. In his report for 1907 and 1908, submitted to the Board of Regents at its meeting on January 6, 1909, the President considered at considerable length various questions relating to the policy and work of the College, and gave a detailed report regarding the conditions throughout the several depatrments, including student and faculty statistics, construction and improvement of buildings, purchase of equipment, organization of schools and departments, advancement of standard, changes in courses of study, etc. By authorization of the Board that report was printed, and it would not seem necessary or desirable that what is given therein should be repeated at this time. This report, therefore, includes such statistics only as were incomplete at the time the material for that report was compiled, with such additional information as may be of immediate interest.

ATTENDANCE.

The attendance during the year 1908-1909, as shown by the report of the Registrar, is as follows:

CLASSIFIED BY COURSES OF STUDY.

Agriculture	317
Forestry	26
Domestic Science and Art	209
Civil Engineering	117
Electrical Engineering	168
Mechanical Engineering	81
Mining Engineering	54
Mechanic Arts (secondary and winter courses)	77
Commerce	144
Pharmacy	88
Special Music	62
Industrial Pedagogy for Teachers	43
Total	1,386
Less names counted twice	35
Total in attendance	1,351

CLASSIFIED ACCORDING TO RESIDENCE.

BY STATES.

Alaska	4
California	19
Colorado	2
Idaho	18
Illinois	7
Indiana	2
Iowa	9
Kansas	6
Kentucky	1
Michigan	3
Missouri	2
Montana	2
Nebraska	9
Nevada	1
New York	1
North Dakota	3
Oregon	1,190
Pennsylvania	3
South Dakota	4
Texas	1
Utah	6
Washington	50
Wisconsin	2
Canada	2
District of Columbia	1
Hawaii	2
India	1
Total	1,351

BY COUNTIES (OREGON).

Baker	23
Benton	229
Clackamas	55
Clatsop	26
Columbia	16
Coos	14
Crook	10
Curry	4
Douglas	34
Gilliam	6
Grant	11
Harney	8
Hood River	28
Jackson	24
Josephine	12
Klamath	14
Lake	1
Lane	45
Lincoln	11
Linn	70
Malheur	1
Marion	62
Morrow	28
Multnomah	182
Polk	45
Sherman	15
Tillamook	7
Umatilla	27
Union	26
Wasco	20
Washington	53
Wheeler	8
Wallowa	11
Yamhill	54
Total	1,190

Total number of counties in Oregon	34
Total number of counties represented	34

GRADUATES.

At the commemencement exercises on June 16, 1909, the graduating class numbered 121. Of these, 110 received bachelors' degrees, and 11 received advanced degrees, as follows:

BACCALAUREATE DEGREES.

Bachelor of Science in Agriculture—

Beaty, Orren	Ballston, Oregon
Fisher, Henry Pervine	Haines, Oregon
Hall, Sylvester Benjamin	Cleone, Oregon
Koeber, James	Sherwood, Oregon
Lazelle, Marshall James	Oregon City, Oregon
Stone, Cedric Hiram	Cleone, Oregon
Williamson, Robert Vernon	Wells, Oregon
Bower, Robert Edgar	Silverton, Oregon
Currin, Harvey William	Ione, Oregon
Dobbin, James Davis	Union, Oregon
Hall, Frank Edward	Cottage Grove, Oregon
McElligott, Edmund Samuel	Ione, Oregon
Nelson, George Allen	Scappoose, Oregon
Schrack, Claude	Tangent, Oregon
Suttle, Herbert George	Portland, Oregon

Tiffany, Jesse Almond	Yacolt, Washington
McCully, Russell Alfred	Joseph, Oregon
Palmer, Wintha Rudolph	Dallas, Oregon

Bachelor of Science in Domestic Science and Art—

Currin, Linnie Edith	Ione, Oregon
Currin, Nettie Elsie	Heppner, Oregon
Edwards, Velma Ethel	Mayville, Oregon
Ewing, Georgia Virginia	Oswego, Oregon
Harpole, Ethel Elnora	Junction City, Oregon
Newkirk, Evalina	Oregon City, Oregon
Pratt, Lois Lucinda	Corvallis, Oregon
Davidson, Gertrude	Ione, Oregon
Irvine, Georgia	McMinnville, Oregon
Pogue, Bessie Evalina	Ontario, Oregon
Russ, Edna Mae	Corvallis, Oregon
Sprague, Helen Maud	Corvallis, Oregon
Starr, Wilda	Corvallis, Oregon
Thomson, Aura Amarilla	Echo, Oregon
Vincent, Pearl Elnora	Corvallis, Oregon
Winniford, Martha Delilah	Corvallis, Oregon
Harrington, Gretta	Corvallis, Oregon
Peery, Maymie Ocleva	McMinnville, Oregon
Bell, Sadie	Corvallis, Oregon

Bachelor of Science in Civil Engineering—

Donnelly, Hamilton Keys	Richmond, Oregon
Golloway, Walter Carl	Hillsboro, Oregon
Kerr, Robert Marriner	Ora, Idaho
Price, Roy Wilbur	Scappoose, Oregon
Strebin, John Curtis	Troutdale, Oregon
Wall, Homer Stacy	Early, Oregon
Webber, Ward Percy	Portland, Oregon
Hensley, William	Troutdale, Oregon
Hudson, Ernest Allsworth	Milton, Oregon
Neal, Roscoe	Baker City, Oregon

Bachelor of Science in Electrical Engineering—

Beaty, Jesse James	Ballston, Oregon
Becker, Frank Richard	Philomath, Oregon
Bendshadler, Charles F.	Elgin, Oregon
Bendshadler, George Henry	Elgin, Oregon
Buchanan, Elmer Clarence	Corvallis, Oregon
Chapman, Alexander Kesterin	Grants Pass, Oregon
Cross, George Albert	Dundee, Oregon
Crowe, Elmer Raymond	Loraine, Oregon
Donelson, Earl Irving	Hillsboro, Oregon
Gilkey, Jesse Smart	Corvallis, Oregon
Groth, Benjamin John	Dundee, Oregon
Howard, Charles Harry	Corvallis, Oregon
Leonard, Charles Herbert	Corvallis, Oregon
Smith, Arthur Byron	Dallas, Oregon
Spires, Fred Lloyd	Myrtle Point, Oregon
Sutton, William Danteler	Portland, Oregon
Zimmerman, Henry Roderick	The Dalles, Oregon
Zimmerman, Peter Chris	North Yamhill, Oregon
Autzen, Thomas John	St. Johns, Oregon
Bell, William Frank	Corvallis, Oregon
Hull, Charles Darwin	Cottage Grove, Oregon

Morgan, Donald Fain	Portland, Oregon
Smith, Neil Tristan	Burns, Oregon
Soi, Mulk Raj	Batalia, India
Harris, Charles Sinclair	Vale, Oregon
Taggart, Durland Orvillle	Vale, Oregon
Worstell, Ralph	La Grande, Oregon

Bachelor of Science in Mechanical Engineering—

Bernard, Albert Francis	Beaverton, Oregon
Karstetter, John Jacob	Silverton, Oregon
Luse, Fred Deniger	Lents, Oregon
Pierce, Ralph Hillar	Harrisburg, Oregon
Rodgers, Robert Henry	Portland, Oregon
Pelland, Philip Oliver	St. Paul, Oregon
Zimmerman, Peter Chris	North Yamhill, Oregon

Bachelor of Science in Mining Engineering—

Peddicord, Jesse J.	Portland, Oregon
Schirmer, Charles Frederick	Oregon City, Oregon
Clark, Roy Ross	Portland, Oregon
Winslow, Gilbert Fayette	Oysterville, Washington

Bachelor of Science in Commerce—

Cale, Philip Harrison	Albany, Oregon
Chambers, Claude Franklin	Corvallis, Oregon
Hancock, Violet Irene	Cove, Oregon
Horner, Alicia Pearl	Corvallis, Oregon
Howe, Callie Alma	Corvallis, Oregon
McHenry, Fred Marshall	Corvallis, Oregon
Michelbook, Frank Lester	McMinnville, Oregon
Rosendorf, Modesta Florence	Corvallis, Oregon
Taylor, Zack Lester	Corvallis, Oregon
True, Ina Content	Corvallis, Oregon
Williamson, Elmer Benton	Albany, Oregon
Baldwin, Delle May	Corvallis, Oregon
Jefferson, Carl Thomas	Weiser, Idaho
Lane, William George	Corvallis, Oregon
McGinnis, Alice Marie	Corvallis, Oregon
Sproat, Marion	Hood River, Oregon
Kerr, Ivan Earl	Ora, Idaho
Moore, Kate Irene	Echo, Oregon
Hawley, Cora	Corvallis, Oregon

Bachelor of Science in Pharmacy—

Schoel, Alfred	Corvallis, Oregon
Williams, Pearl	Jordon Valley, Oregon
Wilson, Frank Jackson	Canyonville, Oregon
Barnes, Charles Irwin	Elgin, Oregon
Callaway, Edward Cleveland	Spokane, Washington
Dunlap, Ella Belle	Shedds, Oregon

ADVANCED DEGREES.

Civil Engineer—

Thompson, Ralph Infield	Heppner, Oregon

Electrical Engineer—

Baker, Walter Rawalt	Salem, Oregon
Christiansen, Conrad	Toledo, Oregon
Schoel, William Amile	Corvallis, Oregon

Mechanical Engineer—

Farnsworth, William Yates	Beverton, Utah
Graf, Samuel Herman	Portland, Oregon
Hanny, John Edward	Oregon City, Oregon

Master of Science—

Allen, Ralph Wilmer	Rickreall, Oregon
Davis, Bertha	Corvallis, Oregon
Graf, Samuel Herman	Portland, Oregon
Vincent, Clarence Cornelius	Corvallis, Oregon

Following is the distribution of the graduating class of 1909 among states and counties.

DISTRIBUTION BY STATES.

Oregon	113
Idaho	3
Utah	1
Washington	3
India	1
Total	121

DISTRIBUTION BY COUNTIES (OREGON).

Baker	2	Malheur	4
Benton	30	Marion	4
Clackamas	5	Morrow	6
Columbia	2	Multnomah	15
Coos	1	Polk	5
Douglas	1	Sherman	1
Gilliam	1	Union	6
Harney	1	Umatilla	3
Hood River	1	Wasco	1
Josephine	1	Washington	4
Lane	4	Wheeler	1
Lincoln	1	Wallowa	1
Linn	5	Yamhill	6

Twenty-six counties represented.

As reported to the Governor and the legislature, the appropriations requested from the State by the Board of Regents for the biennium, July 1, 1909, to June 30, 1911, were as follows:

Maintenance, an increase from $50,000 a year to	$ 100,000
Equipment and improvements for two years	60,000
Buildings and land for two years—	
Central agricultural building	55,000
Horticultural building and greenhouses	45,000
Central heating plant	35,000
Armory and drill hall	35,000
Land	30,000

The Legislature appropriated for—

Maintenance (annual appropriation)	80,000
Equipment for two years	60,000
Buildings and land for two years—	
Central agricultural building	55,000
Central heating plant	35,000
Armory and drill hall	35,000
Greenhouses	5,000
Land	20,000

It will be observed that the amounts requested by the Board of Regents were reduced by $90,000. The over-crowded condition throughout the College and the consequent demand for additional room, equipment, and instructors, made it highly important that the entire amount asked for should be allowed. It is especially unfortunate that any reduction was made in the amount requested for general maintenance. As shown in the report, the estimates of the Board of Regents were very conservative. A reduction in these amounts of $20,000 a year renders it impossible that the necessary repairs and improvements be made in order to care properly for the College plant, and that the number of instructors required be provided to insure the most efficient work in the different department. The College is further embarrassed by the discovery, after the adjournment of the legislature, that the increase provided in the maintenance appropriation will not become available until 1910. This further reduces by $15,000 the income for maintenance for the year 1909-1910.

The delay in commencing work on the buildings for which appropriations were made, occasioned by the effort that was made to invoke the referendum on the College appropriations for buildings and equipment, will render it impossible to get these buildings ready for occupancy until late in the year, probably in March or April. In connection with the referendum agitation, it is very gratifying to record the hearty and general support the College received from the people and the press throughout the State.

A complete inventory of the College property has been taken during the year by the business office. The value of the College plant, as given in the inventory, may be summarized as follows:

Buildings	$ 378,250
Equipment	116,331
Campus and farm lands	336,000
Total	$ 830,581
As reported by the Secretary of State, the funds accruing from the sale of Agricultural College lands, under the act of Congress of 1862, amounted on June 30, 1909, to	196,583
This amount added to the value of the College plant, as given in the inventory, makes the total value of the College property	$ 1,027,164

The appended report of the business office will show the condition of the College finances. From this report it will be observed that on July 1, 1909, there was a deficit of $3,396. This deficit was occasioned by the large increase in attendance and the unavoidable expenditures occasioned thereby, and by the necessity of installing a separate heating plant in the Agronomy Building, instead of heating this building from the general heating plant as originally contemplated. While, as indicated above, the income for maintenance during the coming year will be inadequate to meet all the requirements of the College in providing for the most efficient work, yet, by practicing the most rigid economy, it will be possible to keep the expenditures within the available funds and to close the year on June 30, 1910, without a deficit.

For information regarding the Agricultural Experiment Station, attention is invited to the accompanying report of the Director.

Respectfully submitted,

W. J. KERR,
President of the College.

FINANCIAL REPORTS.

REPORT OF THE TREASURER

From June 30, 1908, to June 30, 1909.

THE COLLEGE.

GENERAL MAINTENANCE—RECEIPTS.

STATE MAINTENANCE.			
Balance on hand July 1, 1908			$ 54 82
State appropriation			50,000 00
Federal maintenance (Morrill)			35,000 00
Land grant interest			17,237 04
MISCELLANEOUS.			
Revolving fund			424 45
SALES.			
Miscellaneous	$ 529 15		
Horticulture	35 00		
Domestic science	55 35		
Mechanic arts	14 50		
Dairy husbandry	732 10		
Campus	88 07		
Chemistry	7 65		
Library fines	41 52		
Rentals	88 22	$ 1,591 56	
FEES AND DEPOSITS.			
Cauthorn hall	$ 912 00		
Waldo hall	654 50		
Entrance $5.00 fee	5,846 00		
Accounting	285 00		
Agronomy	153 50		
Bacteriology	16 50		
Chemistry	3,468 50		
Electrical engineering	205 50		
Dairy husbandry	283 50		
Domestic science and art	940 00		
Mechanical engineering	2,584 00		
Pharmacy	398 50		
Stenography and typewriting	263 50		
Zoology	756 00		
Physical education	2,180 50		
Physics	416 00		
Mining engineering	281 00		
Geology	4 00		
Art	120 50		
Penmanship	12 50		
Forestry and botany	159 50		
Civil engineering	136 50		
Library	10 13		
Unclassified	101 12		
Horticulture	88 00		
Diplomas	585 00		
Thesis	44 00	$ 20,905 75	$ 22,497 31
			$ 125,213 62

GENERAL MAINTENANCE—DISBURSEMENTS.

	Maintenance	Interest	Miscellaneous	Morrill	Totals
GENERAL MAINTENANCE.					
Salaries	$23,450 20	$11,928 70	$ 5,445 66	$35,000 00	$ 75,824 56
Labor	5,661 03		4,512 63		10,173 66
Supplies	6,943 57		4,722 34		11,665 91
Fuel	4,765 85		136 22		4,902 07
Insurance			201 29		201 29
Light, heat, power	551 70		717 40		1,269 10
Telephone and telegraph	320 86		344 27		665 13
Postage and stationery	116 46		142 19		258 65
Printing and advertising	1,866 54		198 24		2,062 78
Water tax	493 15		567 15		1,060 30
Traveling expenses	1,094 70		660 60		1,755 30
Incidental expenses	691 63		210 55		902 18
Piano rental	64 00				64 00
Totals	$46,019 69	$11,928 70	$17,856 54	$35,000 00	$110,804 93
REPAIRS.					
Buildings	$ 43 56	$	$ 454 79	$	$ 498 35
Equipment	40 77		58 64		99 41
Totals	$ 84 33	$	$ 513 43	$	$ 597 76
EQUIPMENT.					
Furniture	$ 789 99	$	$ 499 65	$	$ 1,239 64
Machinery and implements	1,626 57		2,998 97		4,625 54
Scientific apparatus	1,001 88		2,107 49		3,109 37
Books, magazines, etc.	631 36		527 59		1,158 95
Live stock					
Unclassified	458 05		52 34		510 34
Totals	$ 4,507 85	$	$ 6,136 04	$	$ 10,643 89
IMPROVEMENTS.					
New buildings	$ 1,117 12	$	$ 468 59	$	$ 1,585 71
Old buildings	103 14		286 75		389 89
Campus and water works	115 08		166 74		281 82
Shops and barns	129 83				129 83
Totals	$ 1,465 17	$	$ 922 08	$	$ 2,387 25
Experiment Station	$ 1,566 84	$	$	$	$
Refunded fees	400 00		2,210 18		
Totals	$54,043 88	$11,928 70	$27,638 27	$35,000 00	$128,610 85

SPECIAL STATE APPROPRIATION 1907, 1908.

RECEIPTS.

State appropriation	$ 65,000 00	
Expended 1907, 1908	14,367 80	
Balance	$ 50,632 20	
Balance 1906, 1907	228 78	
Balance Prof. Crawford's report	116 34	
Total	$ 50,977 32	
Less $2.20 difference between Prof. Crawford's and Secretary of State Benson's accounts	2 20	
	$ 50,975 12	$ 50,975 12

DISBURSEMENTS.

Buildings	Improvements	Repairs	Totals		
Administration	$ 2,557 85	$ 169 10	$ 2,726 95		
Armory	24 61	241 55	266 16		
Agricultural Hall	366 35	100 22	466 57		
Barns	1,331 17		1,331 17		
Old barns	714 00		714 00		
Mechanic Arts	1,988 13	22 95	2,011 08		
Waldo Hall	310 90		310 90		
Cauthorn Hall	1,504 36	44 20	1,548 56		
Heating plant	73 30	52 03	125 33		
Poultry houses	192 54		192 54		
Alpha Hall	152 85		152 85		
Horticultural	3 00	35 20	38 20		
Agronomy Hall	35,013 18		35,013 18		
Mining Laboratory	511 00		511 00		
Campus	124 11	2 10	126 21		
Totals	$ 46,888 50	$ 782 60	$ 47,671 10	$ 47,671 10	
Equipment (departmental)				$ 3,304 02	
					$ 50,975 12

RECAPITULATION.

GENERAL MAINTENANCE—RECEIPTS.		
State maintenance	$ 50,054 82	
Federal maintenance (Morrill)	35,000 00	
Land grant interest	17,237 04	
Revolving fund	424 45	
Miscellaneous	22,497 31	
Total	$ 125,213 62	$ 125,213 62
DISBURSEMENTS.		
State maintenance	$ 54,043 88	
Federal maintenance (Morrill)	35,000 00	
Land grant interest	11,928 70	
Miscellaneous	27,638 27	
Total	$ 128,610 85	$ 128,610 85
Deficit		$ 3,397 23

SPECIAL STATE APPROPRIATION.

Receipts	$ 50,975 12
Disbursements	50,975 12

. STATION FUNDS.

	Hatch	Adams	Miscellaneous	Totals
RECEIPTS.				
Balance appropriation 1907, 1908	$ 50	$ 40	$ 45 58	$ 46 48
Appropriation 1907, 1908	15,000 00	11,000 00	----------	26,000 00
Sales, etc.	----------	----------	2,995 86	2,995 86
Totals	$ 15,000 50	$ 11,000 40	$ 3,041 44	$ 29,042 34
DISBURSEMENTS.				
Salaries	$ 9,913 90	$ 6,089 89	$ 1,015 80	$ 17,019 59
Labor	1,825 46	1,455 10	1,783 05	5,063 61
Publications	721 86	----------	20 06	741 92
Postage and stationery	175 15	80 00	5 35	260 50
Freight and express	28 75	----------	----------	28 75
Heat, light, water	----------	4 88	----------	4 88
Chemical supplies	231 91	461 69	43 42	737 02
Seeds, plants, sundry supplies	439 35	240 88	103 39	783 62
Fertilizers	7 34	7 60	----------	14 94
Feeding stuffs	918 14	423 94	15 60	1,357 68
Library	2 00	62 70	----------	64 70
Tools, implements, machinery	243 10	18 45	----------	261 55
Furniture fixtures	----------	----------	----------	----------
Scientific apparatus	82 24	86 76	----------	169 00
Live stock	51 65	242 50	15 72	309 87
Traveling expenses	140 25	1,571 63	33 80	1,745 68
Contingent expenses	206 62	250 78	5 25	462 65
Building and repairs	12 79	3 60	----------	16 39
Totals	$ 15,000 51	$ 11,000 40	$ 3,041 44	$ 29,042 35

OFFICERS OF ADMINISTRATION AND INSTRUCTION DURING YEAR 1908–1909.

Name and official position	Salary		Total
	Station	College	
William Kasper Kerr, D. Sc., President	$----------	$ 5,000 00	$ 5,000 00
James Withycombe, M. Agr., Director of Experiment Station, Professor of Animal Husbandry	1,300 00	700 00	2,000 00
Arthur Burton Cordley, M. S., Dean School of Agriculture, Professor of Zoology and Entomology	800 00	1,000 00	1,800 00
Grant Adelbert Covell, M. E., Dean School of Engineering and Mechanic Arts, Professor of Mechanical Engineering	------------	1,800 00	1,800 00
Juliet Greer, A. B., Dean School of Domestic Science and Art, Professor of Domestic Science	------------	2,000 00	2,000 00
John Andrew Bexell, A. M., Dean School of Commerce, Professor of Business Administration, Financial Secretary	------------	2,000 00	2,000 00
Frederick Berchtold, A. M., Professor of English Language and Literature	------------	1,600 00	1,600 00
John B. Horner, A. M., Litt. D., Professor of History and Political Science, Registrar	------------	1,600 00	1,600 00
Gordon Vernon Skelton, C. E., Professor of Civil Engineering	------------	1,700 00	1,700 00
Edward Ralph Lake, M. S., Professor of Forestry and Botany	------------	1,700 00	1,700 00
John Fulton, M. S., Professor of General and Analytical Chemistry	------------	1,700 00	1,700 00
Thomas Henry Crawford, A. M., Professor of Commercial Law	------------	1,500 00	1,500 00
Claude Isaac Lewis, M. S. A., Professor of Horticulture	1,100 00	700 00	1,800 00
Fred LeRoy Kent, B. Agr., Professor of Dairy Husbandry	1,000 00	400 00	1,400 00
Charles Leslie Johnson, B. S., Professor of Mathematics	------------	1,500 00	1,500 00
Emile Francis Pernot, M. S., Professor of Bacteriology	1,400 00	300 00	1,700 00
Clarence Melville McKellips, Ph. C., Professor of Pharmacy	------------	1,500 00	1,500 00
Gerard Taillandier, Professor of Modern Languages	------------	1,600 00	1,600 00
U. G. McAlexander, Captain 13th Infantry, United States Army, Commandant, Professor Military Science and Tactics	------------	900 00	900 00
James Dryden, Professor of Poultry Husbandry	1,000 00	800 00	1,800 00
Thomas Mooney Gardner, M. M. E., Professor Electrical Engineering	------------	1,800 00	1,800 00
Henry Desborough Scudder, B. S., Professor of Agronomy	850 00	850 00	1,700 00
Henry Martin Parks, B. S., E. M., Professor of Mining Engineering	------------	2,000 00	2,000 00
Charles Edward Bradley, M. S., Professor of Agricultural Chemistry	1,500 00	------------	1,500 00
Emmett Dunn Angell, Director of the Gymnasium, Professor of Physical Education	------------	1,800 00	1,800 00
William Frederick Gaskins, B. S., Professor of Music (depends on fees received from students for salary)	------------	------------	------------
William Arthur Jensen, Recorder of the Faculties, Secretary to the President	------------	1,400 00	1,400 00
Ida Burnett Callahan, B. S., Assistant Professor of English Language and Literature	------------	1,100 00	1,100 00
Farley D. McLouth, B. S., Assistant Professor of Art	------------	1,200 00	1,200 00

OFFICERS OF ADMINISTRATION AND INSTRUCTION—*Continued.*

Name and official position	Salary		Total
	Station	College	
Mark Clyde Phillips, B. M. E., Assistant Professor of Mechanical Engineering	$	$ 1,350 00	$ 1,350 00
Ida Angeline Kidder, A. B., Librarian	200 00	800 00	1,000 00
Nicholas Tartar, B. S., Instructor of Mathematics		1,000 00	1,000 00
John Colburn Bridwell, B. S., Instructor in Zoology and Entomology	300 00	900 00	1,200 00
Harry L. Beard, B. S., Director of Cadet Band, Instructor in Mathematics		1,000 00	1,000 00
Loren Burton Baldwin, A. M., Instructor in English		1,000 00	1,000 00
Earl Vincent Hawley, B. S., Instructor in Electrical Engineering		800 00	800 00
Grace Gatch, A. B., Instructor in History and Latin		800 00	800 00
William McCauley Porter, Instructor in Forging		720 00	720 00
Charles Arthur Cole, M. S., Instructor in Horticulture	600 00	400 00	1,000 00
Herman V. Tartar, B. S., Instructor in Chemistry		1,000 00	1,000 00
Elmer Polic Johnson, B. S., Instructor in Carpentry		1,350 00	1,350 00
Roy E. Heater, Instructor in Physical Education		900 00	900 00
Marion Syddum Van Liew, Instructor in Domestic Science		1,000 00	1,000 00
Ariel M. Ewing, Instructor in Domestic Art		1,000 00	1,000 00
Helen Hyde Tobin, Instructor in Domestic Art		1,200 00	1,200 00
Erwin L. Potter, B. S., Instructor in Animal Husbandry	400 00	600 00	1,000 00
C. L. Knopf, M. E., Instructor in Mechanical Engineering		1,000 00	1,000 00
Ralph D. Hetzel, A. B. LL. B., Instructor in Public Speaking and Debating		1,200 00	1,200 00
Winnifred Maude Williams, B. Ph., Instructor in English and Physical Culture for Women		1,100 00	1,100 00
Edward B. Beaty, B. S., Instructor in Mathematics		900 00	900 00
Willibald Weniger, Ph. D., Instructor in Physics		1,200 00	1,200 00
Simon N. Caceres, C. E., Instructor in Spanish and Mathematics		1,000 00	1,000 00
H. Lew Mathre, Instructor in Commerce		900 00	900 00
Arthur L. Peck, B. S., Instructor in Floriculture and Landscape Gardening		1,400 00	1,400 00
George Robert Hyslop, B. Sc., Instructor in Agronomy	500 00	700 00	1,200 00
Earl Paul Harding, B. S., Instructor in Pharmacy and Chemistry		800 00	800 00
Genevieve Baum-Gaskins, Instructor in Music (depends on fees for salary)			
Adma Green, Instructor in Art		800 00	800 00
Exra S. Dixon, Instructor in English		550 00	550 00
William R. Boone, Instructor in Piano (depends upon fees received from students)			
Nettie M. Flinn, Instructor in Mandolin, Piano and Violin (depends upon fees received from students)			
Ralph Wilmer Allen, B. S., Assistant in Horticulture	720 00		720 00

OFFICERS OF ADMINISTRATION AND INSTRUCTION—*Concluded.*

Name and official position	Salary		Total
	Station	College	
Clarence Cornelius Vincent, B. S., Assistant in Horticulture	$ 720 00	$	$ 720 00
Fred Clark Ewing, B. S., Assistant in Entomology	720 00		720 00
Claude Cliffton Cate, B. S., Assistant in Plant Pathology	720 00		720 00
Otto Gerald Simpson, B. S., Assistant in Dairy Husbandry		$ 400 00	$ 400 00
Fred L. Griffin, B. S., Assistant in Zoology and Entomology	300 00	300 00	600 00
Laura Hill, B. S., Assistant in Zoology and Entomology	200 00	280 00	480 00
Samuel Herman Graf, B. S., Assistant in Mechanical Engineering		300 00	300 00
Wilford W. Gardner, C. E., Assistant in Civil Engineering		300 00	300 00
Herbert Edward Cooke, B. S., Assistant in Mining Engineering		600 00	600 00
Renton Kirkwood Brodie, B. S., Assistant in Chemistry		250 00	250 00
Helen Margaret Gilkey, B. S., Asssstant in Botany		200 00	200 00
Glenn DeHaven, B. S., Assistant in Racteriology	300 00		300 00
Frances Houston, Assistant in Physical Education		150 00	150 00
B. F. Irvine, Treasurer Board of Regents		500 00	500 00
E. E. Wilson, Secretary Board of Regents		400 00	400 00
E. P. Erwin, Head Janitor		1,000 00	1,000 00
M. D. Hall, Assistant Janitor		600 00	600 00
S. A. Tharp, Assistant Janitor, Night Watchman		600 00	600 00
J. A. Spangler, Fireman Power Plant	60 00	740 00	800 00
G. B. Keady, Foreman Printing Plant		1,200 00	1,200 00
A. W. Keady, Assistant Foreman Printing Plant	400 00	600 00	1,000 00
A. Applewhite, Foreman College Farm	720 00		720 00
J. A. Gilkey, Campus Foreman		440 00	440 00
John W. Piper, Teamster		440 00	440 00
H. F. Woods, Farm Teamster	600 00		600 00
A. H. Cramer, Farm Hand	600 00		600 00
H. L. Holgate, B. S., Station Stenographer	825 00		825 00
W. Horace Kerr, Clerk Business Office	300 00	600 00	900 00
Juanita Rosendorf, Assistant Registrar		757 50	757 50
Totals	$18,135 00	$78,177 50	$ 96,312 50

Above list shows yearly rate. As some employees were put on the salary list in September only nine months' salary was drawn.

Total amounts paid by Station Funds	$ 17,019 59
Total amounts paid by College Funds	75,824 56

Respectfully submitted,

B. F. Irvine, *Treasurer.*

AGRICULTURAL EXPERIMENT STATION

REPORT OF THE DIRECTOR

To the President of the College,

Sir: The Director of the Experiment Station has the honor of submitting herewith a synoptical report of the work of the different departments of the Station for the year ending June 30, 1909.

At the outset the Director desires first to express to the President and to all of the members of the station staff his keen appreciation of their loyal support and feels deeply grateful that the endeavors of the Station for the year just closed have been characterized by a spirit of helpfulness, cooperation and general good will among all of the departments.

The work of the Station is constantly widening in scope, but the field is so large and the problems so many that progress seems slow when considered in relation to the opportunities for scientific research. This, however, is but a natural sequence in a State like our own with its possible thirty million acres of tillable land. An extremely wide range of agricultural production and an era of rapid development bring urgent demands upon the Station for assistance. The Station has endeavored so far as practicable to meet every request for aid and by so doing the routine work has been greatly increased.

In the establishment of the demonstration farm at Hermiston and a similar farm in the typical dry farming region, the foundation will be laid for work that should prove of exceptional value to the agricultural interests of the State. In this relation it may be added that the great problem in the non-irrigable agricultural sections of the so-called Inland Empire is not so much a question of increased production as it is a question of perpetuity of production. For example, the dry farmed districts of Eastern Oregon produce annually about ten million bushel of wheat. This wheat takes from the soil $2,400,000 worth of nitrogen and under the existing systems of farming in these sections there is scarcely any nitrogen returned to the soil. Thus the great practical problem is how can this nitrogen be restored and the present wheat yield maintained and even increased. Soil exhaustion is the greatest bane of agriculture.

Farming by irrigation is becoming an important factor in the agriculture of this State. Through private and corporate enterprises and the reclamation work undertaken by the federal government a large area of land is being reclaimed. It is estimated that within a comparatively short time there will be 380,000 acres of land reclaimed in Oregon by means of irrigation. This will include a wide range of soils and represent variable climatic conditions, thus evolving innumerable problems for solution.

Horticulture is making a phenomenal development. At the present rate of planting with modern cultural methods, surrounded with proper safeguards for the control of pests and diseases, the annual output of the industry within twenty years should reach an approximate value of fifty million dollars. This will rest largely, however, upon the assistance given by this Station. Even at present the Station is constantly appealed to for help. It has been the policy of this Station to render all possible aid to the industry. In fact the Station has been singularly fortunate in being able under the Adams act to maintain representatives both at Hood River and Rogue River for the past two growing seasons. Much valuable data have been secured from these investigations.

It is of the utmost importance that the greatest possible amount of cooperative work be undertaken with growers. In fact it would be well if some definite experiments could be conducted in the Rogue River Valley. This valley has conditions peculiarly its own, thus presenting an important field for scientific investigations. The cooperative work in the establishment of young orchards at Estacada and at Molalla have been satisfactory and have resulted so far in creating a wholesome sentiment in behalf of better orchard methods. The orchard at Estacada was very successfully used in a field demonstration in connection with a farmers' institute.

There is no question but what the Station is an important factor in promoting better agricultural practices throughout the State. The station, however, should be strengthened in some departments. More animal husbandry is required. This State is destined to become a great stock growing center and facilities should be afforded for more demonstrative and experimental work along these lines. This will require more land and live stock. In fact, it is extremely unfortunate that the Station is in possession of so little land for experimental work. Not only is more land needed for work in agronomy and animal husbandry, but the department of horticulture is also in need of more land. It is highly desirable in the investigational work of cherry gummosis that a large number of cherry trees should be grown, but the unfortunate inadequacy of land precludes this. Land is also needed for work in market gardening. With the rapid development of our cities and towns comes a growing demand for vegetables. Thus the Station at present is being constatnly appealed for information of this class. Unfortunately but little experimental and practical data upon this subject is available at this Station.

The leasing of the Meeker orchard has proven to be very satisfactory and has enabled the departments of horticulture and entomology to do much work and the data secured thereby will be valuable to the horticultural interests of the State. It would be well to continue this lease, also lease the adjoining land in this property for a period of at least ten years, if practicable. There should also be purchased or leased some river bottom loam land for work in market gardening and the experimental growing of small fruits.

The natural physical division of the State by the Cascade range of mountains creates two rather distinctive agricultural sections. Methods in one section which may be successful may prove entirely impractical in the other. Thus for the eastern portion of the State the Eastern Oregon Experiment Station should be made the center for all of the experimental work in that section. This station has an abundance of rich soil splendidly adapted to work in animal husbandry, horticulture, plant breeding and sugar beet culture. These should be made the major lines of work at this Station. Some valuable work in the breeding of grasses, cereals and sugar beets has been accomplished and a good beginning has been made in horticulture and animal husbandry. This year the experimental work in animal husbandry consists of fattening hogs with peas grown as a rotation crop with cereals.

There is, however, a large and very important field presented by this section not only in the commercial growing of hogs but also in the fattening of beef. With the establishment of modern abattoirs at Portland, market discrimination will become much keener and values for first class cattle will go much higher than the average range of prices is at present. This will have a tendency to develop the stock feeding industry which at first will bring many unsolved problems to the feeder. The Eastern Oregon Experiment Station should at the earliest practicable opportunity take up this work with the aim of working out the most feasible and economical way of finishing range cattle for the market. The Station should also give some attention to the hog growing industry. This may be done by experimental feeding to demonstrate if possible that hogs can be profitably grown upon the wheat farms of that section. It is a peculiar anamalous condition that a very large percentage of the hogs slaughtered in this State come from Nebraska—they should be grown on Oregon farms.

There is also the great undeveloped agricultural section of Central Oregon that is calling for help from the Station.

Perhaps one of the most notable fields in this section for agricultural work is the Harney Valley. This valley with the valleys immediately tributary thereto comprises nearly a million acres of agricultural land. If systematic cooperative work could be undertakin in dry farming methods and the growing of cereals and forage plants it would be immensely helpful in hastening the development of this region.

The college farm is in a very dilapidated condition for the want of fences and gates. It is very discouraging to be continuously apologizing for the unkempt condition of the farm. In addition to fences and gates considerable tile drainage is needed. The farm could be made much more productive and could be more economically operated if it were better drained.

DEPARTMENT OF HORTICULTURE.

ADAMS WORK.

Project I. Pollenation of the Apple.

Investigations under this project are progressing very satisfactorily. The results of the work for the past two years have been published in Bulletin 104. The work the past spring has been especially gratifying. We have been working out some of the best pollenizers for the Spitzenburg, Newton, Northern Spy and Gravenstein, and are working on the mutual affinities of our leading varieties. We have done some interesting work on the visibility of pollen and in addition have some work on pears as to the sterility and fertility of the leading varieties and some of the most successful crosses. The work is being carried on at Hood River, Rogue River, and at this Station.

In addition to the pollenation problems, we have also conducted extensive smudging and frost fighting experiments.

Project II. Irrigation of the Apple.

We are now conducting our third season's experiments along the lines of determining the best time to apply water when one or more irrigations are made, the action of this water on the soil, the tree, and the intrinsic qualities of the fruit. We have three orchards in the Rogue River Valley, representing different types, and the work this season is progressing more satisfactorily than ever before. We expect to have some valuable data this fall.

Project III. Gummosis of the Cherry.

This investigation is in cooperation with the Department of Entomology and Plant Pathology. We have made a start in this work by supplying ourselves with a stock of cherries for experiments in the relation of grafting to gummosis.

WORK UNDER THE HATCH FUND.

1. *Loganberry Experiment.*

To determine which is the best fertilizer and combination of fertilizers for the Logan, also to determine which gives the best results—clean culture, sod, mulch, and mulch and manure. Twenty-four plots in test.

2. *Raspberry and Blackberry.*

Variety tests. Just beginning, only a few varieties each.

3. *Gooseberries and Currants.*

Variety tests. Also several thousand seedling gooseberry, currant and raspberry plants.

4. *Strawberries.*

Variety tests, irrigated vs. unirrigated. Also to determine best distances apart to set certain varieties to get best results. Breeding experiments will be carried on in connection with the variety tests.

5. *Filberts.*

Variety tests. Also to determine which is the best method for pruning.

6. *Grapes.*

Variety tests.

7. *Peaches.*

Variety tests on both clay soil and sandy loam. Also pruning and cultural methods will be studied.

8. *Pears.*

Variety tests and comparison of standard and dwarf trees.

9. *Apples.*

Variety orchard with a comparison of open and center head pruning.

10. *Cover crops.*

Test of different crops and combination of crops and their effects on soil, tree and fruit. Also a comparison of clean culture, sod, sod mulch, sod and manure, mulch, mulch and manure. Experiments are also being carried on in Hood River, Rogue River, and at the Eastern Oregon Experiment Station.

11. *Walnut Stock and Walnut Grafting.*

Tests to determine the best stock and best method of propagation.

12. *Gummosis of the Cherry.*

Grafting and budding methods to determine which has a tendency to prevent gumming.

DEPARTMENT OF ENTOMOLOGY AND PLANT PATHOLOGY.

ADAMS ACT.

Project I. Study of Lime-Sulphur Spray.

In connection with this investigation it is deemed especially desirable to undertake an exhaustive chemical study of the various compounds developed in the lime-sulphur spray and their behavior under varying conditions.

Project II. Apple-tree Anthracnose.

An exhaustive investigation of this diease has been made for the past two years and much data that should prove of value in its control have been obtained.

In the progress of the investigation it was found that what appeared to be anthracnose occurred upon other fruit trees than the apple and this has been carefully studied by means of cross inoculation.

Horticulture and Entomology I.

This is cooperative work between the two departments in the study of cherry gummosis.

HATCH ACT.

1 *Peach Spot Experiments.*

This is cooperative work with growers at Ashland and has resulted very satisfactorily.

2. *Potato Spraying Experiments.*

This was conducted last year but unfortunately yielded no practical results.

3. *Celery Leaf Blight.*

Excellent results have been secured in checking this disease.

Routine Work.

The routine work of this department is increasing very rapidly. There are great demands upon the department to make field investigations of orchard pests. At present a special investigation is being made of the red spider which is reported as doing great damage to hops.

DEPARTMENT OF AGRONOMY.

The endeavors of this department are directed mainly along lines of work previously reported. The principal investigations are—

Experiments with long and short rotation systems for improvement of soil fertility.

Testing the adaptability and value of alfalfa for hay and pasture.

Testing the adaptability and value of kale as a winter dairy feed or soiling crop.

Experiment in testing varieties of vetch, adaptability and value for Willamette Valley climatic and soil conditions. In co-operation with the U. S. Department of Agriculture (Bureau of Plant Industry).

Experiment in cooperation with the station chemical department in breeding vetch for higher protein content.

Experiments in breeding of kale to increase the yield and value of this important stock feed by developing uniformity of type, compactness of growth, weather resisting qualities, succulency, etc.

Experiments in cooperation with the U. S. Department of Agriculture (Division of Farm Management) in testing the value of cultivation compared with no cultivation without weeds.

Experiment testing the value of irrigation on the Station farm of vetch, clover and alfalfa in cooperation with the U. S. Department of Agriculture (Office of Experiment Stations).

DEPARTMENT OF CHEMISTRY.

ADAMS ACT.

Project I. Soil Leaching Experiments.

Effects of calcium and potassium in fixing or freeing fertilizer constituents in the soil.

Project II. Study of lupulin and other active principles of hops, including effects of high and low temperatures in drying upon these principles and the value of the cured product.

Much cooperative work has been done with the Department of Poultry Husbandry in the study of products formed in an incubation egg and in testing the effect of moisture and carbon dioxide on same. Also a large amount of work has been done on insecticides and fungicides in cooperation with the Department of Entomology.

HATCH ACT.

1. A chemical study of the total plant food content of the various types of Oregon soils. Heretofore only acid soluble potash, phosphates and lime had been studied.

2. Vetch Selection—One hundred and thirty-one samples of vetch were analyzed for moisture and protein in the problem of vetch selection.

3. Fertilizer Control—Forty samples of fertilizers were analyzed in fertilizer control work.

4. Co-operative work with Klamath Falls Reclamation Service on the composition of the ground waters of the Klamath Basin.

5. Insecticide work in co-operation with the U. S. Department of Agriculture on methods for analyzing insecticides.

6. Peppermint—Peppermint plants introduced from Michigan have made a good growth and samples will be distilled this fall.

7. Chemical study of composition of Willamette and Columbia River water throughout the year. Samples have been collected monthly since December and will be collected for one year and complete analysis made.

Routine Work.

From July 1, 1908, to June 30, 1909, the department received for analysis 490 samples as follows:

131	vetch samples.
149	soils.
60	waters.
40	fertilizers.
19	insecticides.
12	feeds.
79	miscellaneous.

DEPARTMENT OF BACTERIOLOGY.

1. Investigation of the mortality of incubator chicks, in co-operation with the Department of Poultry Husbandry.

2. Comparative tests of bacterial content of machine and hand-drawn milk to determine the most efficient and simplest means of sterilizing the milking machine.

3. Investigation in cheese-curing in sausage casings. Cheddar and soft cheese have been cured in this manner with excellent results.

4. Investigations in nitrifying organisms. Experiments with organisms in their relation to the formation of tubers, such as potatoes, have responded remarkably well to inoculations.

A great deal of routine work has been done by this department in the investigation of diseases, waters, etc.

DEPARTMENT OF POULTRY HUSBANDRY.

ADAMS ACT.

Project I. Incubation Experiments.

In the incubation work the chemical and bacteriological departments have co-operated. Much work has been done and considerable data secured, throwing additional light on this problem. During the year Bulletin 100, containing the results of the experiments up to that time, was published. This gives the results of tests on the relative efficiency of natural and artificial methods of incubation.

HATCH ACT.

1. Investigation in methods of brooding chicks.
2. Poultry breeding work.

A block of 200 fowls were purchased from different breeders of the State last fall. Trap nests were installed in all of the houses, and record is being kept of the number of eggs laid by each hen. At the end of the laying year selection from this flock will be made on the basis of egg yield, and these will be used for breeding next year. This is probably the most important line of work that the poultry department can carry on.

DEPARTMENT OF DAIRY HUSBANDRY.

1. Milking machine investigations.
2. Investigations of problems relating to the variation in the fat content of hand-separator cream.
3. Testing dairy herds for individual farmers.
4. Testing pure-bred animals for advanced registration.
5. Miscellaneous testing of samples of milk, cream, and butter for butter fat content sent in from various sources.
6. A study of intensive dairying with the station herd. A determination of what can be done with green crops for both summer and winter feeding with reference to maximum production and economy of same.
7. An investigation of the percentage of solids not fat in milk, both actual and with relation to the fat content.
8. A study of the possibilities in the manufacture and sale of soft cheese (Camembert, etc.) in the State, particularly where transportation is a serious problem.

DEPARTMENT OF ANIMAL HUSBANDRY.

The principal work of this department during the past year consisted mainly in the experimental feeding of swine.

1. A feeding experiment with wheat and barley. Results indicated that barley is about equal with wheat in value for feeding hogs. Gains secured from food consumed corroborated former experiments, viz., that four and one-half pounds of grain will produce one pound live weight in hogs.
2. Feeding experiments to determine the value of skim milk in fattening hogs.

Two experiments were conducted with skim milk as a supplementary food for hogs with the result that the skim milk gave a return of 81 cents per cwt.

3. Feeding experiments with kale as a winter maintenance ration for grown hogs.

The results indicated that hogs can not only be maintained on kale but that they will make a slight gain.

4. Experimental feeding of young hogs to determine an economical winter ration.

Two lots were used in this experiment. Lot one was fed one pound of chopped wheat per day to each hog with what kale they would eat up clean. Lot two was fed one pound of chopped wheat to each hog per day with what mangels they would consume. Both lots made good gains, but the kale-fed lot made the better gain.

5. Continuation in soil experiments with cows.

FARMERS' INSTITUTES.

A less number of institutes were conducted during the past year than usual. This was in a measure due to the running of the demonstration trains. It is plainly manifest that the institute is a lively factor for the promotion of better farm practices. Wherever the institute is held changes for the better are quickly in evidence. Better cultural methods and more intensive crop production are the logical corollary of the institute. Through the courtesy of the Southern Pacific Railroad Company two co-operative demonstration trains were operated last year, one in the Willamette Valley and one in Southern Oregon. These trains were phenomenally successful in point of interest and attendance. The train operated in the Willamette Valley made 27 stops with a total attendance of 19,250 people. The one operated in Southern Oregon made 15 stops with an attendance of 21,480 people.

There were 35 regular farmers' institutes held during the year ending June 30, 1909, consisting of 79 sessions with an aggregate attendance of 16,930. The total attendance of the institutes and demonstration trains was 57,660 people.

BULLETINS.

The following bulletins were published during the year ending June 30, 1909:

No. 100—Incubation Experiments.

No. 101—Orchard Survey of Jackson County.

No. 102—Digestibility of Kale, Vetch Hay, Steamed and Unsteamed Silage.

No. 103—An Investigation of the Mortality of Incubator Chicks.
No. 104—Pollenation of the Apple.
No. 105—Culture of Small Fruits.
Circular No. 3—Notes on Nut Culture.
Total aggregate pages of published material, 216.
Mailing list, 10,000.

CORRESPONDENCE.

The correspondence of the station is rapidly assuming mammoth proportions, and it is absolutely necessary that additional stenographic help be supplied. Total number of letters sent out during the year, 12,800.

Respectfully submitted,

JAMES WITHYCOMBE,
Director.

July 19, 1909.

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1912-14

OREGON
AGRICULTURAL
COLLEGE

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BIENNIAL REPORT

OF THE

BOARD OF REGENTS

1912-1914

College Bulletin   Issued Monthly   Number 190

Entered as second-class matter November 27, 1909, at the postoffice at Corvallis, Oregon, under the Act of July 16, 1894.

OREGON
AGRICULTURAL
COLLEGE

BIENNIAL REPORT

OF THE

BOARD OF REGENTS

1912-1914

CORVALLIS
COLLEGE PRINTING PLANT
1915

Honorable Oswald West,

Governor of the State of Oregon.

Sir:

In accordance with the law, I herewith submit the report of the Board of Regents of the Oregon State Agricultural College for the biennial period ending December 31, 1914, including the report of the President of the College and the appended reports of the Treasurer and of the Director of the Experiment Station and other officers.

Respectfully submitted,

J. K. WEATHERFORD,

President of the Board of Regents.

January, 1915.

OREGON AGRICULTURAL COLLEGE

PRESIDENT'S BIENNIAL REPORT

1912-1914

To the Board of Regents:

The President of the College has the honor to submit to the Board of Regents his report for the years 1912-13 and 1913-14, together with a statement of the condition of the College, an estimate of its needs, and certain recommendations regarding its future development.

It is a pleasure to be able to report a continuation of the rapid growth of the preceding biennium. There has been a large increase in student enrollment and in the instructional force; requirements for admission have been increased, and the standard of work advanced; the courses of study have been revised and strengthened; additional equipment has been provided; new buildings have been constructed; some of the older buildings have been remodeled, and other improvements have been made, all of which greatly add to the facilities for thorough and efficient work throughout the institution.

Important Legislation.

By far the most important matters affecting the work and policy of the College, and determining the direction and extent of its future development, have been (1) the passage by the State legislature in 1913 of laws providing a permanent income for the support of the College, including the mill-tax levy for Resident Instruction and continuing annual appropriations for the Extension Service; (2) the passage by the United States Congress in 1914 of the Smith-Lever Bill, which provides for cooperation between the Federal Government and the land-grant colleges in the several states in carrying on different phases of extension work in agriculture and home economics; and (3) the orders issued by the Oregon State Board of Higher Curricula defining the function and field of the State Agricultural College and the position this institution shall occupy in the educational system of the State.

Permanent Financial Support.

1. As stated in the President's last biennial report, "One of the great problems in modern education is to get the institutions of higher learning on a business-like financial basis. Any large industrial enterprise, if successful, outlines its policy for a term of years, and provides in its budget for all the different purposes according to the nature of the business and the character and extent of its operations. An educational institution on its financial side should be regarded as a great business enterprise, and everything about it should be as strictly managed in accordance with up-to-date business principles as is any commercial institution. But in a college or university that is dependent upon periodical appropriations for support, this is impossible. That permanent funds be provided, is important for the reason that it is necessary to know, at least approximately, for some time in advance, what the income will be in order that definite plans may be made for the future. This would insure the highest standard of efficiency in the work, as well as the most advantageous and economical development of the plant."

Millage Tax and Continuing Appropriations.

An institution of higher learning dependent upon the State for support may be permanently financed either by fixed continuing appropriations or by millage-tax levies. Neither of these is ideal. Under continuing appropriation measures providing a fixed annual income, no provision is made for the increased requirements of the institution occasioned by its growth. The advantage of the State tax levy, on the other hand, is that it provides a permanent income that increases with the growth of the State. The disadvantage of this plan, however, is that the increase in the income derived from the millage tax, and the increase in student enrollment and institutional requirements, may not run parallel, in which case the income from the tax would be either inadequate or unnecessarily large.* The former is more likely to be true, particularly in a new and rapidly growing state where the demands upon an educational institution such as the Agricultural College are likely to precede and to be greatly in excess of the development of the state and the corresponding increase in the value of its taxable property. A combination of these two plans is generally found to be most satisfactory, definite continuing appropriations being provided for certain specific purposes, and the mill-tax levy furnishing the income necessary for the regular instructional work and the development of the plant necessary in providing therefor. This is particularly true of the Oregon State Agricultural College. The extent and character of its activities are such that neither plan alone would be adequate. The two together, however, as provided at present by the State legislature, give permanent financial support in a way best adapted to the varying needs of the institution.

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*See President's Report, Oregon State Agricultural College, 1910-12, pp. LXIX-LXXI.

Sources of Financial Support.

The general support of the College, including the requirements for maintenance, equipment, permanent improvements, buildings, land, etc., is provided for through the mill-tax levy. The income for the Experiment Station work, including the branch stations in different parts of the State, is derived from Federal appropriations and special continuing State appropriations. The State appropriations required for this work have been provided by different special legislative enactments, according to the location, extent, and character of the work, and the cooperative assistance received either from the Federal Government or from other sources. The Extension Service is financed through the act of the State legislature passed at the session of 1913. It is generally recognized throughout the country that this Oregon extension law is one of the best and most comprehensive laws of the kind in the United States. Under its provisions, as fully explained elsewhere in this Report, the extension work of the College is largely cooperative, funds therefor being provided by the State, the Federal Government, and different counties of the State.

Smith-Lever Federal Law.

2. The cooperative extension act passed by Congress in 1914 is one of the most constructive educational measures ever adopted by the United States Government. Heretofore the United States Department of Agriculture has engaged in certain phases of extension work in different states. Through a lack of proper understanding and coordination, however, there has been more or less duplication of effort, with corresponding waste and impairment of efficiency. The Smith-Lever Act provides for cooperation in all extension work between the United States Department of Agriculture and

the land-grant institutions in the several states. "It guarantees," as sated by Secretary Houston, "a coordination of the forces of the two jurisdictions, places the brains of the two great agencies in conjunction, eliminates waste and friction, and insures efficiency."

It is now generally recognized that one of the most important lines of activity in which the agricultural colleges are engaed, is in the field of agricultural extension. In no other state in the Union is the need for such work greater than in Oregon. With its large area, small population, and great variation in elevation and climate, the conditions in Oregon are such that farm demonstration and other phases of extension work are not only of the greatest importance in the development of the agriculture of the State, but they are also relatively most expensive. It is a great achievement, therefore, that all the forces available for extension work, Federal and State, should be brought together under a cooperative plan such as to insure the accomplishment of the greatest possible good.

State Board of Higher Curricula.

3. In 1909 the State legislature passed a law establishing the State Board of Higher Curricula, the duties of which were "to determine what courses of study or departments, if any, shall not be duplicated in the higher educational institutions of Oregon, and to determine and define the courses of study and departments to be offered by each such institution." After having investigated the conditions at the educational institutions, the Board gave public hearings, as required by law, and in April, 1910, issued an order as published in the Report of the President of the College for that year, making a certain division of work as between the State Agricultural College and the State University. The most important feature of this order was that certain engineering work might be continued at both of these institutions. This, however, appeared not to have been entirely satisfactory, the claim being made that conditions in this State were not such as to warrant the maintenance of duplicate courses in engineering, with the necessary equipment for the work thereof, in each of the two State institutions.

Soon after the adjournment of the State legislature in 1913, therefore, the Board of Higher Curricula resumed its investigations, which continued over a period of about a year. Several

Engineering work Centered at the College.

public hearings were given, and orders were finally issued requiring that all engineering courses should be centered at the Agricultural College, and otherwise defining the work of the two institutions so as to avoid a duplication of courses and to insure, as it was thought, the development of each institution in its own distinctive field in a way best to serve the interests of the State. By this order the interpretation of the function and field of the Agricultural College is in strict accord with the provisions of the organic act of Congress passed in 1862, and the acts of Congress supplementary thereto.

College Field Outlined.

The distinctive work of the Agricultural College is thus placed in the field of applied science, or technical education. Provision is also made, of course, for the necessary basic work in the natural and physical sciences, and for instruction in the general subjects that constitute an essential part of all college courses.

Stability of Policy Insured.

With the different divisions of College work permanently financed, therefore, as indicated above, and the field of its activities clearly defined, a stability of policy, otherwise impossible, is insured; and the College, for the first time in its history, is placed in a position where it can devote its energies uninterruptedly to positive, constructive effort, thereby insuring the most economic expenditure of its funds and the attainment of the highest degree of efficiency.

STUDENTS.

The total number of different persons who received instruction in the College during the year 1912-13 was 2,314; during the year, 1913-14, 2,435. These include regular matriculates in the full-year courses and those who attended the winter short courses and the summer session, but do not include persons enrolled in correspondence or other extension work. For purposes of comparison, the students in each of these three divisions during the past four years are listed in the following table:

	1910-11	1911-12	1912-13	1913-14
Regular matriculates	970	1,142	1,364	1,579
Winter short courses	649	1,583	852	669
Summer session	156	143	98	187
Totals	1,778	2,868	2,314	2,435

It will be observed that the number of students in the regular-course work has rapidly increased, the advancement during the three years being from 970 to 1,579. The decrease during the past two or three years in the enrollment in the winter short courses is largely due no doubt to the short course work provided for in different parts of the State through the College Extension Service.

Ratio of Men to Women.

During recent years there has been a greater relative increase in the number of women students than of men. In the regular four-years courses, the enrollment of women increased during the four years, 1910 to 1914, from 265 to 493, or 86 per cent. During the same period, the enrollment of men increased from 705 to 1086, or 54 per cent. The ratio of men to women, not including those registered in the short courses and in the summer school, is approximately two to one.

The distribution of students among the different courses is indicated in the following table, which, for purposes of comparison, covers the four years, 1910-11 to 1913-14, inclusive.

	1910-11		1911-12		1912-13		1913-14	
	Full-year	Short course	Full-year	Short course	Full-year	Short course	Full-year	Short course
Agriculture	237	527	303	1432	429	621	496	521
Forestry	31		32	6	51	3	81	
Home Economics	147	168	213	103	270	201	326	126
Engineering and Industrial Arts	286	10	282	28	299	12	302	3
Commerce	123	11	145	14	143	15	160	19
Pharmacy	48		55		51		69	
Optional	22		21		59		86	
Music	76		91		62		59	
Summer School		174		143		98		187
Totals	970	890*	1142	1726	1364	950	1579	856

Increased Enrollment Present Year.

The registration for the year 1914-15 is incomplete, as many students enter in January and at the opening of the second semester. The enrollment to date, however, shows an increase over that of the preceding year of 114. This is evidence of a remarkable growth, considering the fact that at the beginning of the present school year the standard had been advanced by adding the equivalent of one year's high school work to the requirements for admission. Under the circumstances, indeed, the showing would have been regarded as favorable had there been no increase in student enrollment during the present year.

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*Includes 82 names counted twice.

Age of Students.

There has been a gradual increase during recent years in the age of College students. In 1912-13, the average age of students in the secondary or vocational courses was 18 years; in 1913-14, 19 years. The difference in the age of students in the regular degree courses is not so great, the increase from 1912-13 to 1913-14 being from 19.7 to 20.1 years. The average age of the graduating class in 1913-14 was 22.4 years.

Geographical Distribution.

As shown in the report of the Registrar, the student enrollment during each year of the biennial period covered by this report represents every county in Oregon; and, in the year 1912-13, 38 different states and 10 foreign countries, and in 1913-14, 34 different states and 8 foreign countries. During the second year of this period, the number enrolled from Oregon was 2,018; from other states, 377; and from foreign countries, 40. The largest registration from other states was from Washington and California, with 111 students each, followed by Idaho with 32; Illinois, 18; New York, 13; and Alaska (Territory) and Maine, 7 each.

College and University Transfers.

As a further indication of the standard of the College work and the reputation of the institution in other states, it is interesting to note that a larger number of students enter each year from other colleges and universities. Most of the matriculates from such institutions have completed one or two years' work at the time of entering the Oregon State Agricultural College, while some of them come to this institution for the work of the senior year or for graduate study. The number who thus entered in 1912-13 was 64, and in 1913-14, 73. During 1913-14 students transferred to this institution from 33 different colleges and universities and from 9 different normal schools. As indicated in the Registrar's report, among the institutions represented in this list are included the State Universities of Michigan, Nebraska, Iowa, Washington, Oregon; and the state agricultural colleges of Kansas, Oklahoma, Connecticut, Michigan, Indiana, and Massachusetts, while a number of private colleges and universities are included, such as Willamette University, Whitman College, and Occidental College. Of the total number who received degrees from the Oregon Agricultural College in 1913, 31 had transferred to this institution from other colleges and universities; and in 1914, 41.

Graduates.

Complete lists of the graduating classes are given in full in the Registrar's report. The number for 1913 was 104; for 1914, 172. The relatively small class in 1913 may be attributed to the fact that this year marked the transition period in the advancement of the College from the lower to the higher standard. There would have been no graduates with degrees in 1913, in fact, except for the entrance of students with advanced standing from other institutions. The class of 1915, which will exceed 220, shows a decided gain over that of 1914. The greatest increase in the number of graduates during the biennium was in the schools of Agriculture and Home Economics. In Agriculture, the number of graduates in 1914 was 57, 111 per cent greater than in 1912; while in Home Economics the number of graduates in 1914 was 46, or 39 per cent greater than in 1912. The number of graduates from the courses in Engineering, Forestry, Commerce, and Pharmacy, was about the same for the two years.

Students Selp-supporting.

Approximately 65 per cent of the students are largely or wholly self-dependent. There is little variation from year to year in the proportion of self-supporting students. During the school year many students find employment in the College, doing office, janitorial, or shop work, or assisting in the laboratories, dormitories, orchards, barns, or on the College farms; while others secure agencies of various kinds or get employment in the city requiring only part of their time. As much as possible of the miscellaneous labor about the College, consistent with economy and efficiency, is given to students. As a means of assisting students, every effort possible is made to reduce the cost of attending the College. To this end, all laboratory, shop, and other student fees are reduced to the minimum required in purchasing the laboratory or other student supplies. Student entertainments also are limited both in number and cost, all such entertainments being under the close supervision of a faculty committee.

The Student Loan Fund, established some years ago, has been of great assistance in helping worthy students, many of whom, without such assistance, would not have been able to complete their courses. As shown in the detailed report of the College Treasurer, printed in the appendices, the aggregate contributions to this fund, with the interest received on loans, now total $3,660.

Student Loan Fund.

Since the establishment of the fund, 140 loans have been made, the average loan being about $38. The number of loans at present totals 72, aggregating $2,593, or an average of $36. With a student body numbering each year between 2,000 and 3,000, particularly in an institution of this kind, the present student loan fund is entirely inadequate. This fund should not be less at the present time than $10,000. With such a fund, a large number of the most worthy young men and women would be assisted each year in getting the advantages afforded by the College, to whom such advantages would otherwise be impossible. There are few other ways in which the same amount of money could be used to better advantage.

Student Self-Government.

As submitted in the President's Report two years ago, the plan of student self-government was adopted at the Oregon State Agricultural College in December, 1910. The marked success of this movement during the first biennium has been continued during the second biennium. Members of the Student Body Council, charged with the responsibility of administering the plan, have discharged their duties with a fairness and impartiality, and yet with a firmness, that have won for them the hearty support and commendation of the entire College community. During the four years of student government there has been a gradual decrease in the number of cases requiring formal action by the Council. There has undoubtedly been a corresponding improvement in student deportment. In this institution, student self-government is thoroughly established and is universally accepted as a splendid success.

STANDARD ADVANCED.

One of the most important acts by the Board of Regents during the biennium was to advance the standard of College work. For many years in Oregon there were few high schools, and none with provision for industrial courses. Under such conditions it was impracticable to require the completion of a four-year high-school course for admission to the College. During recent years, however, many high schools have been established in different parts of the State, there being at present, according to the report of the State Superintendent of Public Instruction, about 260. Furthermore, many of the high schools are now offering courses in industrial subjects, such as agriculture, manual training, and domestic science and art. As the number of high schools has increased and provision has been made therein for industrial subjects, correspondingly fewer students have come to the College without high-school training. The extent to which this is true is shown by the fact that as late as ten years ago there were practically no high-school graduates in the Agricultural College, and comparatively few who had attended high schools at all, and these through only one or two years. Of the 670 intrants for the year 1912-13, however, only 67 entered from the eighth grade (for the secondary industrial courses) ; and of these, only 40 did not have access in their home towns to high-school courses through three or four years. All the others, 630, entered from high schools and academies, or from other colleges and universities. It will be observed, therefore, that, while the requirements for admission to the degree courses included only two years' high-school work, most of the students had completed at entrance the equivalent of at least three years' high-school work.

Preparation of Intrants.

There appeared, therefore, neither necessity for nor advantage in a continuation of the existing standard. Accordingly, by action of the Board of Regents on November 30, 1912, the requirements for admission to the degree courses were increased, beginning September, 1914, from two to three years of high-school work. In accordance with an order issued by the State Board of Higher Curricula on December 19, 1913, the Board of Regents of the Agricultural College on April 8, 1914, adopted a resolution adding another year to the entrance requirements beginning September, 1915. At that time, therefore, the College standard will be on a four-year high-school entrance basis.

Entrance Requirements Increased.

These changes have been made in order that the College courses may be properly articulated with the high schools of the State, and the work adjusted on a basis such as to make it of the

Vocational Courses Established.

greatest possible value. In the changes mentioned, however, it was not contemplated that persons without high-school training, but desiring to attend the Agricultural College, should be denied the advantages afforded by this institution. For them, vocational courses are maintained, as heretofore, which students may enter from the eighth grade. These vocational courses include agriculture, dairying, home-making, forestry, industrial arts, and commerce or business methods.

In this respect, the experience in Oregon is much the same as in other states. For many years after the establishment of the agricultural colleges, the standard of these institutions was lower than that of other instituions of higher learning. This was unavoidable under the conditions existing at that time. With the development of high schools, however, and the introduction into these schools of industrial subjects, the standard of the agricultural colleges has been advanced, particularly during the past ten years, until now, with few exceptions, all these institutions are on a four-year high-school basis, though in most states, as in Oregon, industrial courses are provided to which mature persons are admitted with less than four years' high-school preparation. The fact is, that in all the states these institutions have developed as the country has developed. They have increased their entrance requirements and advanced the standard of scholarship as rapidly as conditions in the several states would warrant.

FACULTY.

Faculty Statistics.

The College staff is classified into the three groups required for the work of resident instruction, the agricultural experiment station, and the extension service. For the year 1914-15, the instructional force comprises 6 deans, 31 professors, 8 associate professors, 21 assistant professors, 69 instructors, 9 fellows, and 4 library and 10 laboratory assistants, representing the full-time equivalent of 137, exclusive of clerks and stenographers. The Experiment Station staff, including the superintendents of branch stations, aggregate 45. Of these, 18 devote their entire time to station work, while 27 give part time to resident instruction or to extension service. Excluding clerical assistance, the Experiment Station staff represents the full-time equivalent of 29. The number of employees in the Extension Service is 33, of whom 20 give full time to extension work, and 13 devote part of their time to resident instruction or to experimental work. The Extension staff represents the full-time equivalent of 24, not counting clerical force.

Breadth of Faculty Training.

Members of the faculty have attended as many as 149 different colleges and universities, including nine universities of Europe and one of Canada. They have received 200 first degrees, 66 advanced degrees, and 15 normal certificates or diplomas; while 50 have completed from one to two years' work toward advanced degrees, and 35 have attended summer sessions in different institutions throughout the country. A large number of faculty members have attended two or more different colleges and universities. Of the total number in the faculty, 63 have attended the Oregon State Agricultural College. Of these, 52 have received Bachelor's degrees, and 8 Master's degrees, while 30 have also attended other colleges and universities. The five members who have attended the Agricultural College but have not received their degrees from this institution, have either graduated from other colleges or universities, or are now employed on part time as shop and laboratory assistants while completing the work required for graduation.

Colleges and Universities Represented.

The number of representatives on the faculty from different colleges and universities, exclusive of the Oregon Agricultural College, varies from one to 20, the University of Chicago being represented by 20; Cornell University, 17; University of Illinois, 16; University of California, 15; Columbia University (N. Y.), 13; University of Wisconsin, 13; Harvard University, 11; Kansas Agricultural College, 9; Iowa State College, 7; Michigan Agricultural College, 6; University of Michigan, 5; Stanford University, 5; Indiana State University, 4; Massachusetts Agricultural College, 4; Oklahoma Agricultural College, 4; South Dakota Agricultural College, 4. The following institutions are represented by three each: Yale University, University of Pennsylvania, Rochester University, Baker University, Brown University, Illinois State Normal School, Kansas State Normal, University of Minnesota, University of Nebraska, Purdue University, Pratt Institute, American Conservatory of Music, Sargent School of Physical Education, Willamette University, and Wabash College. Among the other institutions represented are: Massachusetts State Normal, New York State Normal, New Mexico Agricultural College, Nebraska State Normal, North Dakota Agricultural College, Ohio Wesleyan University, University of Oregon, Oregon State Normal School, Oberlin University, Pennsylvania State College, St. Louis Law School, Stout Institute, Swarthmore College, University of Utah, Vermont University, Virginia Polytechnic Institute, Western Reserve University, Washington State University, Washington State College, Wellesley College, Wisconsin State Normal School. The foreign institutions represented are the University of Strassburg, University of Halle, University of Berlin, University of Bazel, Switzerland Normal University, Fenelon College, Victoria College of Music, Royal College, Queen's University, and McDonald Institute.

COURSES AND ORGANIZATION.

Board of Higher Curricula.

Reference has already been made to the orders of the Oregon State Board of Higher Curricula determining the courses of study that should be offered by the State University and the Agricultural College. In the biennial report of the President of the College for the years 1910-12, page XVII, are published the orders of the Board issued on April 28, 1910, relative to the Agricultural College.

On June 24, 1913, notice was given that a meeting of the Board of Higher Curricula would be held on August 25, 1913, at which it was proposed:

"1. To eliminate from the University of Oregon and to assign to the Oregon Agricultural College the departments of Electrical Engineering, Chemical Engineering, and Civil Engineering, conditioned on the Oregon Agricultural College requiring a full four-years high school course or its equivalent as a preparation for entrance for degrees in all engineering courses.

"2. To eliminate from the Oregon Agricultural College and assign to the University of Oregon the departments of (a) Fine Arts, including Architecture and Music; (b) Economics; (c) Commerce (higher); (d) Education; (e) Graduate School."

Meetings were held at the time indicated, and the hearings were continued to December 19. On December 20, the Board issued the following orders:

> "1. That the departments of Electrical Engineering and Chemical Engineering be eliminated from the University of Oregon and assigned to the Oregon Agricultural College, conditioned on the Oregon Agricultural College requiring a four-years high school course or its equivalent as a preparation for admission to all engineering courses leading to degrees.
>
> "2. That Proposition 2 (Notice, June 24, 1913) be adopted in full, with the provision that a more particular definition of the several departments under this head shall be made in conference with the heads of the State University and the Agricultural College."

It will be observed from the above orders that no decision was reached at this meeting regarding the subject of Civil Engineering. At a meeting of the Board held on February 7, 1914, however, it was ordered:

> "1. That the department of Civil Engineering be eliminated from the Oregon Agricultural College, except such courses in Civil Engineering as are required in other departments of engineering, including Highway and Irrigation Engineering, and in the departments of Forestry and Agriculture at the College. * * *
>
> "2. That the department of Civil Engineering be eliminated from the University of Oregon." * * *

It was also ordered that there should be no further matriculation in Civil Engineering at either the Agricultural College or the State University, but that it should be discretionary on the part of the Regents of each of these institutions "to maintain the Civil Engineering Course until its completion by students matriculated prior to the date of this order."

After conference with the presidents of the two institutions, at which a statement had been agreed upon defining the several departments listed in Proposition 2, as provided in the order issued on December 20, 1913, it was ordered:

> "That the several departments be defined and confined as follows:
>
> "**Architecture.** The State University may offer work leading to degrees in architecture with particular emphasis on architectural design

and architectural history and art. The State Agricultural College may offer courses **leading to degrees*** in structural and rural architecture, including such incidental instruction as may be required in architectural design.

"**Music.** Music as a special subject of instruction leading to degrees shall be confined to the State University, except that the State Agricultural College may continue instruction in Music as now offered as an accessory only to the regular courses of that institution as herein defined, but no degrees shall be conferred in Music by said Agricultural College.

"**Economics and Political Science.** Economics and Political Science are assigned to the State University, except that the State Agricultural College shall not be required to discontinue such elementary and applied courses in these subjects as are essential to the general training of the students. Such training naturally embraces subjects underlying all good citizenship, as well as those which supplement the various technical courses of the Agricultural College. It is also understood that the State Agricultural College shall have the right to continue and develop the work in rural sociology and agricultural economics.

"**Commerce.** The curricula in Commerce in the State Agricultural College shall be limited to the work required for the bachelor's degree, in accordance with the orders of the Board of Higher Curricula issued April 28, 1910, and April 26, 1913, as this work will in no way interfere with or be in duplication of the work in higher commerce assigned to the State University; except that the said College shall not be inhibited from offering such advanced work in business administration and management as may be required in the agricultural, engineering, and other regular courses of the Agricultural College, except Commerce.

"**Education.** The School of Education shall be confined to the State University, except that the State Agricultural College may maintain a department of Industrial Education and provide for such instruction in connection therewith, or related thereto, as may be necessary in training persons to teach industrial subjects in the common and high schools in accordance with the provisions of the Nelson Amendment of 1907 to the Morrill Act of 1890, as approved in the order of the Board of Higher Curricula issued April 28, 1910.

"**The Graduate School.** The Graduate School as such shall be confined to the State University. The State Agricultural College, however, shall not be inhibited from offering advanced or graduate work in the different courses distinctive of that institution, except Commerce. The

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*At the meeting of the Board of Higher Curricula held on March 13, 1914, objection was made to the authorization given the Agricultural College to offer work "leading to degrees" in Architecture. It was claimed that since all engineering work had been discontinued at the State University and assigned wholly to the Agricultural College, the course in Architecture leading to degrees should be confined to the University. After this question had been considered by members of the Board of Higher Curricula, the President of the College, in behalf of this institution, assented to the elimination of the words, "leading to degrees," from the second sentence in the paragraph on Architecture and waived the right under the law to thirty days' notice before

Agricultural College shall also offer graduate work in rural sociology and agricultural economics.

"**Extension Work.** The Extension work of the State University and of the State Agricultural College shall be confined strictly to the respective fields of these institutions as defined above."

It will be observed that by the orders of the Board of Higher Curricula the work of the Oregon State Agricultural College is not changed except that this institution may not continue the course leading to degrees in Civil Engineering. Since all engineering work is discontinued at the State University, the effect of this order is to abolish entirely the degree course in Civil Engineering. The College had not offered work in commerce beyond the requirements for the baccalaureate degree. The subjects in "higher commerce," as defined by the President of the Board of Higher Curricula, had not been provided for nor announced by this institution.* By these orders, however, the Agricultural College is inhibited from developing work in duplication of any of the distinctive courses of the State University.

Civil Engineering Discontinued.

The College, therefore, is left to continue the policy adopted some years ago of concentrating its efforts upon the special features distinctive of land-grant college work. The object in view in shaping this policy has been twofold: first, to make the best possible use of available resources in building up a strong institution for the promotion of agricultural and industrial education; and second, to avoid attempting work in a field that could be best covered by the State University. With increasingly large demands made upon the institution, and limited funds available both for maintenance and development, it has been thought that greater good

College Policy Indicated.

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definite action should be taken by the Board. In compliance with a provision of the law, however, the Secretary issued a call for a meeting in April, 1914, for the purpose of securing formal action on this question. But it was found impracticable, as reported by the Secretary, to get a meeting at that time, or at a later date, and the order of the Board, therefore, stands as originally issued. The Agricultural College, however, has not offered a degree course in Architecture, nor does it contemplate doing so. Upon recommendation of the President of the College, moreover, the Board of Regents of the College, at a meeting held on January 6, 1915, decided to discontinue the work in architecture as heretofore given, and after the present year to confine the work of the College in this field to Rural Architecture. It is not contemplated, however, that degrees be conferred in this work; but, rather, that it should be one of the options offered in the School of Agriculture.

*The question of defining "higher commerce" as contemplated for the University, was referred by the Board of Higher Curricula to its President, Dr. J. R. Wilson.

could be accomplished by strengthening the distinctive technical courses and making the College strong in its own field, rather than by attempting to cover a broader field with corresponding dissipation of energy and resources, and the resultant impairment of efficiency. Moreover, as the State University already occupied the field of liberal and fine arts and the professions, there appeared neither reason for, nor justification in, a duplication of the work in this field by the Agricultural College.

Rural Architecture.

In line with this policy, also, as indicated in a footnote on a preceding page, instead of attempting to develop a regular degree course in Architecture, the plan is to confine the work of the College in this field to such subjects in Rural Architecture as there might be demand for in meeting the needs of the rural population. There will be regular resident instruction which may be taken as a major in the School of Agriculture, or elected by different students who are pursuing other courses. Extension work in this field will also be emphasized. The purpose is to make this work as practical as possible, with stress upon a consideration of the relative strength, durability, and cost of building materials, and the preparation of plans and specifications. The work will include the planning of such buildings as rural churches, rural schools, farm dwellings, horse barns, dairy barns, hog barns, silos, and poultry buildings, with a study of their construction, lighting, ventilation, convenience, sanitation, plumbing, systems of water supply, and sewage disposal.

Standard Advanced.

In harmony with the orders of the Board of Higher Curricula, the Board of Regents of the Agricultural College has advanced the standard of this institution, as more fully explained on a preceding page of this report, by increasing the requirements for admission to the degree courses to include the equivalent of four years' high-school work.

The degree courses of study offered by the Agricultural College under the authority of the State Board of Higher Curricula are as follows: Agriculture, Home Economics, Forestry, Logging Engineering, Mechanical Engineering, Electrical Engineering, Mining Engineering, Highway Engineering, Irrigation Engineering, Industrial Arts, Pharmacy, and Commerce.

College Courses.

The purpose of the course in Industrial Arts is to afford the preparation required for teaching manual training, referred to particularly in the paragraph on Education in the order of the Board of Higher Curricula. There is no limitation as to the grade of work offered in any of these courses except Commerce. Since "higher commerce" is assigned to the University, the Agricultural College is inhibited from offering advanced degrees in this subject. Graduate work, however, may be given as desired in Rural Sociology and in Agricultural Economics.

Opportunities for Special Study.

The rapid growth of the College during recent years, and the large increase in student enrollment, has made possible a greater division of the work in a number of the departments. This is notably true in Agriculture, but is also true to some extent in Home Economics and in other courses. This allows students greater opportunity for specialization along the particular lines in which they have interest. In Agriculture, for instance, students may not only major in such divisions as Agronomy, Horticulture, Dairy Husbandry, Poultry Husbandry, and Animal Husbandry, but within these fields they may specialize still further in some particular subdivision. In Dairy Husbandry, for example, students may major either in dairy production or in dairy manufacture; in Agronomy—in farm crops, soils, irrigation and drainage, farm mechanics, farm management; in Horticulture—in pomology, olericulture, landscape gardening, floriculture. They may also major in the work required in preparation for teaching agriculture. In Home Economics they may specialize in domestic science, domestic art, home administration, institutional management, applied design, education. Other options are: in Electrical Engineering—electric railways, power plants, illumination and contracting; in the School of Mines—mining engineering, ceramics, industrial chemistry; in Commerce—business administration, economics, secretarial studies.

As reported two years ago, the Board of Regents, at its meeting held on January 8, 1913, established a course in Logging Engineering, and authorized the President of the College to make application to the State Board of Higher Curricula for its approval. The details of this course were worked out by the Professor of Forestry in conference with a committee representing the Oregon branch of the Pacific Logging Congress, and the course as thus outlined was approved by the State Board of Higher Curricula at its meeting held on April 26, 1913.

Course in Logging Engineering Established.

The Board of Regents, at a meeting held on July 19, 1913, established the School of Forestry and the School of Mines, the former comprising the courses in Forestry and Logging Engineering, and the latter, the courses in Mining Engineering, Ceramics, and Industrial Chemistry.

New Schools Established.

At a meeting held on October 9, 1914, the Board of Regents also established the Bureau of Organization and Markets. The purpose of this organization is to secure harmony and greater coordination in the work of promoting farm efficiency and in assisting in the solution of the problems of distribution or marketing, by the different departments of the Extension Service, the Experiment Station, and Resident Instruction. Another purpose is to have at the College an organization with which various state organizations can cooperate in this work, such as the State Grange, Farmers' Union, Farmers' Society of Equity, etc. Dr. Hector Macpherson, Professor of Rural Economics, was elected Director. While at Washington in November, in attendance at the convention of the Association of American Agricultural Colleges and Experiment Stations, the President of the College made arrangements with the officials of the U. S. Department of Agriculture for cooperative work between the Office of Markets of that department and the Bureau of Organization and Markets of the Agricultural College. Additional information regarding the work of the Bureau will be found in the appended report of the Dean of the School of Commerce.

Bureau of Markets.

Another important change during the biennium was the abolishment of the secondary courses in Agriculture, Home Economics, Forestry, Commerce, and Mechanic Arts, and the establishment in lieu thereof of vocational courses in general Agriculture, Dairying, Forestry, Home-making, Business, and Mechanic Arts. As shown elsewhere in this report, there had been a gradual decrease for several years in the number of students entering the College for secondary courses. This was due, no doubt, in large part, at least, to the establishment of industrial courses in the high schools. On the other hand, there has been an increasing demand for special vocational work extending through one semester, or from one to three years, according to the character of the work. It was to meet this demand that the vocational courses were organized. A more complete statement regarding the character and extent of these courses will be found in the appended reports of the deans.

Vocational Courses Supplant Secondary Courses.

There has also been a more complete organization and coordination of the winter short courses. The work of Farmers' Week, partaking rather of the character of the extension service than of regular resident instruction, has been transferred to the Extension Division and has been enlarged to include various industrial conferences.

GROWTH OF THE COLLEGE.

In the section of this report on Students, will be found information regarding the number of students registered in the different courses, indicating the increase in attendance during the biennium. It will be noted that during the past four years, the registration in the regular long courses has increased from 970 to 1,579, or 63 per cent. The enrollment of women during this period increased from 265 to 493, or 86 per cent; and the enrollment of men from 705 to 1086, or 54 per cent. There is also an increase in the enrollment during the present year over that of 1913-14 of more than five per cent, notwithstanding the advancement of the standard by adding the equivalent of one year's high-school work to the requirements for admission.

Students.

The directions in which the College is growing, the rapidity of its development, and its relative needs, are more clearly shown by reference to the work actually done in the different depart-

Increase in Instructional Requirements.

ments and to the number of students taking this work. This information is given for the two years of the biennium in the accompanying table. This table shows the increase in the number of students pursuing work in the different departments and in the number of instructional hours. Exclusive of the special work in Military Drill and in Physical Education, the average increase in all departments in the number of students was 21 per cent; in the number of instructional hours, 23 per cent. From this table it will be noted that the greatest growth has been in the School of

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A comparative statement of Students and Instructional Hours for the years 1912-13 and 1913-14, is given in the table that follows. The figures given are the average for the two semesters of each year.

DEPARTMENT	1912-13		1913-14		Per cent increase	
	Students	Inst. Hours	Students	Inst. Hours	Students	Inst. Hours
Agronomy	240	62	451	104	87	67
Animal Husbandry	252	27	297	39	17	44
Dairy Husbandry	109	36	196	48	80	33
Bacteriology	162	43	179	45	10	5
Bot. and Plant Path	367	77	468	106	27	37
Horticulture	328	70	422	112	28	60
Poultry Husbandry	36	22	25	15	31†	32†
Zoology and Entomology	255	57	308	94	21	65
Veterinary Medicine	21	8	53	10	153	25
Civil Engineering	141	70	197	73	39	4
Electrical Engr.	87	32	78	36	10†	12
Mech. Engr.	242	60	326	62	34	3
Exper. Engr.	54	32	70	46	29	44
Shopwork	303	147	371	178	22	21
Mining Engr.	57	45	56	67	2	49
Domestic Art*	347	103	356	115	2	11
Domestic Science*	314	68	504	104	60	53
Commerce**	707	116	937	163	32	40
Pharmacy	122	35	178	55	45	57
Forestry	79	40	108	45	36	12
Chemistry	523	133	635	143	21	7
Physics	263	73	250	60	4†	17†
Mathematics	492	98	528	109	7	11
English and Pub. Spk	1263	129	1289	125	2	3†
Modern Language	298	50	331	58	11	16
History	134	18	100	15	25†	16†
Art and Architecture	256	65	283	93	10	43
Industrial Pedagogy	79	16	84	18	6	12
Average					21	23

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*In the School of Home Economics the aggregate average increase in the number of students in all the different divisions was 30 per cent; in the number of instructional hours, 28 per cent. **Includes Political Science and Political Economy. †Decrease.

Agriculture, the increase in the number of students in the different departments of this school being 42 per cent; in the number of instructional hours, 43 per cent. In the School of Home Economics, the increase in the number of students has been 30 per cent, and in the number of instructional hours, 28 per cent; while in Commerce, the aggregate average increase in number of students in the different departments has been 32 per cent as compared with a 40 per cent increase in instructional hours. A large part of this increase in Commerce, however, is in the work taken by students who are registered in other courses, such as Home Economics, Agriculture, Forestry, Engineering.

Growth in Agriculture.

In the School of Agriculture, 227 different courses of instruction are now given with a total of 659 semester credits. The number of students in the freshman and sophomore years has become so large that it is necessary to divide the classes into several different sections, making the work actually given equivalent to a total of 864 semester credits. The growth of this School is shown by the fact that as late as 1911-12 the number of different courses offered was 198 and the number of semester credits, 527. As further indicating the advancement of the work in Agriculture, it may be noted that the number of graduate students in Agriculture in 1911-12 was 7; in 1912-13, 14; in 1913-14, 15, while to December 21 of the present year, the number had increased to 25. Although the total enrollment during the biennium 1912-14 in the regular full-year courses in the School of Agriculture has increased over the preceding two years 71 per cent, it is significant to note that during the same period the increase in the instructional staff has been but 39 per cent.

Forestry.

The growth in the School of Forestry has also been very marked, especially considering the inadequate facilities provided for the forestry work, the total increase in the number of students for 1910-14 being 130 per cent. The average number of students in the different subjects in Forestry increased during the past two years, as indicated in the preceding table, 36 per cent; the number of instructional hours, 12 per cent.

In the School of Engineering, conditions are much the same as in other institutions of higher learning throughout the country. With rare exceptions, engineering schools have made little advancement during recent years, some of them, indeed, having decreased rather than increased in student enrollment. At the College, however, during the four years, 1910 to 1914, there has been an aggregate increase of 16.5 per cent. In the amount of work actually given in the School of Engineering, as shown by the number of students registered in the different subjects, and the number of instructional hours, there has been a large increase during recent years. This may be attributed largely to an increase in the number of students in other courses, as in Agriculture and Forestry, who are taking engineering subjects, and to the relative increase in the proportion of the intrants who pursue their courses to completion, thereby increasing the number of students in the junior and senior years in which most of the technical engineering subjects are taken. In Mechanical Engineering, for instance, the increase in the average number of students during the year 1913-14 over the preceding year was 34 per cent; in Experimental Engineering, 29 per cent; in Civil Engineering, 39 per cent. In Electrical Engineering, however, there was a decrease of 10 per cent in the number of students, but an increase of 12 per cent in the number of instructional hours.

Engineering.

Among the service departments, it will be noted that the number of students in Chemistry increased from 523 to 635. In this connection, as indicating the real growth of the College and the demands made upon it for additional room, equipment, and instructional force, it is interesting to note that during the first semester of 1910-11, the total number of students in Chemistry was 314, while during the first semester of the present year the registration in the different courses of this department aggregates 764.

Service Departments.

BUILDINGS AND IMPROVEMENTS.

With the appropriations provided for that purpose by the State legislature in 1913, new buildings have been constructed during the biennium, additional equipment purchased, and other improvements made which have added to the facilities for the work throughout the different departments of the institution.

New Buildings.

The new buildings, which are more fully described in the appended reports of the Deans, include: the Domestic Science wing of the Home Economics Building, completed at a cost of $59,502, exclusive of equipment; two units of the Men's Gymnasium, partly completed at a cost of $68,600, exclusive of heating; the Stock Barn, completed at a cost of $7,064; and the Shop Storage Building, completed at a cost of $1,604.

Buildings Constructed on the Unit Plan.

It will be observed that the plan adopted some years ago of constructing the larger buildings in units, as explained in the report of the President for the preceding biennium, has been continued. This has been necessary on account of the rapid increase in the demand for room. It has been impracticable, moreover, to get sufficient funds at one time to complete an entire building and to provide for the other pressing needs of the institution. By this plan, however, any funds available for buildings can be used in a way to provide the room most needed and at the same time insure that the buildings, so far as constructed, shall be of permanent character, such that when entirely completed they will be adapted to the purposes for which they were planned. The Agricultural Building, for instance, was planned in three units, one unit being constructed during each of three bienniums, but when completed the three together constitute a unity admirably adapted to the needs of the departments in the School of Agriculture for which this building was provided.

Domestic Science Building.

Although the new Domestic Science Building is as large as could be provided with the funds available, consisting of three stories and full basement, still the work in home economics has increased to an extent such that this building even now is crowded to its capacity. By another year it will be necessary to provide class rooms for domestic science and art in other buildings, and within the next three years at most, at least one additional unit of the Home Economics Building will be required. By the removal of the domestic science and art work from the Agricultural buildings, additional room was made available for the work in agriculture. The growth of the agricultural departments, particularly Agronomy, had been such that there was great need for additional room. The rooms in the Agronomy Building, formerly used by the department of Domestic Art, have been converted into an agricultural museum, a crops laboratory, and drafting rooms for rural architecture, irrigation and drainage, while the rooms vacated in the central Agricultural Building are used by the departments of Rural Economics and Political Science. The rooms in the basement of Waldo Hall, that had for a number of years been used by the department of Domestic Science, were remodeled for the work in applied design and for the use of the women in the dormitory.

Men's Gymnasium.

The Men's Gymnasium is planned in four units. At the time the President's report was published two years ago, it was estimated from the preliminary sketches of the architects that this building would cost from $75,000 to $80,000. The cost was greater than it otherwise would be on account of the necessity of using the Gymnasium as a College auditorium and for other general ~~instructional~~ institutional purposes. With more than a thousand men in attendance, and the College growing rapidly, it was apparent that it would be unwise to plan any building for gymnasium work that when completed would accommodate fewer than 2,000 men. With no auditorium available at the College also, it would be necessary to use the main floor of this building for College assemblies; and, to meet these requirements, this room should be large enough to accommodate from 2,000 to 2,500 people. It was deemed impracticable to secure an appropriation at that time sufficient to complete a gymnasium building of the size required and at the same time meet the other needs of the institution for maintenance, additional room, equipment, improvements, etc. The congestion was such, however, in the old gymnasium, then used for both men and women, that it was imperative that some relief be secured. A request was made, therefore, for an appropriation of $40,000 to $50,000 with which partly to complete the central unit. $40,000 was appropriated with the expectation that the central unit could be sufficiently completed for temporary use, and that additions would be made as funds for that purpose could be provided. When the architect's plans were complete, however, and the contractors' bids received, it was found that, on account of the large size of the central unit, it would be impracticable to complete even this part of the building to the extent contemplated within the amount of the appropriation available at that time. It was found advantageous, moreover, and necessary, to provide bathing and other facilities in another unit. As the mill tax law would go into effect on January 1, 1915, and the income therefrom was to be used for buildings and other improvements, as well as for maintenance, the Regents planned to have the construction of this building extend over a period of three rather than two years, and to supplement the special appropriation by the necessary additional amount to be saved for building purposes from the millage tax income. This was the only way, indeed, in which the situation could be met without reducing the building in size in a way such that it would not meet the requirements of the institution. Satisfactory arrangements being made with the contractors, therefore, the building was constructed accordingly, with provision for final payment from this year's income.

Other Important Improvements.

Among the more important items of improvement and equipment are the following: the drainage of one unit of the College farm at a cost of $1,726; the extension of water mains, campus drainage, and other improvements, $6,642; the construction and improvement of walks and drives, $9,734; the construction of an eighteen-inch sewer from the trunk line through the center of the campus to a point west of the Administration Building, with laterals to different buildings, $2,811; the remodeling of Science Hall for the departments of Pharmacy and Chemistry, with additional equipment, $15,721; the remodeling and furnishing of the old Gymnasium for the use of women, $1,870; the equipment of the new Men's Gymnasium, $3,083; the extension of the heating plant, including the construction of an additional unit to the building, the installation of an additional boiler, the enlargement of the main through the old tunnel, the construction of a new tunnel to Waldo Hall and the Men's Gymnasium and the new Domestic Science building, and other miscellaneous improvements, $18,837; the remodeling and furnishing of Cauthorn Hall, converting this building from a men's to a women's dormitory, $6,687; constructing colony houses, breeding coops and fences, and remodeling and furnishing the old wooden horticultural building for the Poultry department, $3,400; the installation of cold storage plants in the Dairy and Horticultural buildings, $4,225; the purchase of pure-bred live stock for the Dairy and Animal Husbandry departments, $9,777; the equipment of the Experimental Engineering laboratory, $5,392; the equipment of the new School of Mines Building, including geological museum, ore-dressing and ceramics laboratories, $6,833; the equipment and furnishing of the new Domestic Science Building, including plumbing, electric fixtures, desks and furniture, miscellaneous equipment, and the installation of a gas machine, $13,120.

Land Purchased.

As explained in different biennial reports, the College has had difficulty in securing at reasonable prices different tracts of land required for College buildings. After negotiations extending over a number of years, the last of these tracts, four in number, containing about eight acres, were finally purchased during 1913, at a total cost of $14,831. During the biennium final payment was also made on the South Farm, amounting to $10,257.50; also the claim for $7,345, on the Horticultural, Dairy, and Farm Mechanics buildings, awarded by arbitrators, in a case contested by the J. C. Winters & Company, contractors.

AGRICULTURAL EXPERIMENT STATION.

In the appended report of the Director and the separate reports of the branch stations and of the Crop Pest and Horticultural Investigations, the work of the Experiment Station during the past two years is fully described. For details concerning this work, reference must be made to these reports.

The most important change during the biennium in the organization of the Experiment Station was the withdrawal of Dr. James Withycombe as Director. Dr. Withycombe submitted his resignation on February 21, 1914, to take effect March 31, 1914. He had been in the service of the College for sixteen years, having come to the institution in 1898, as Vice-Director and Agriculturist of the Experiment Station. In this position, however, he had immediate supervision of the Station work, although the President of the College at that time was also Director of the Experiment Station. In 1901

Director Withycombe Resigns.

the Board of Regents segregated the offices of President and Director, and Dr. Withycombe was made Director. He also occupied the position of Professor of Agriculture, and had general charge of the instructional work in agriculture, as well as of research and investigation. In 1908, however, there having been established a number of different professorships in agriculture, with a large increase in student enrollment, the agricultural research and instructional work was segregated, and the departments for resident instruction were organized into a School of Agriculture with a separate dean. This made it possible for the Director to concentrate his efforts upon the work of the Experiment Station.

Development of Station.

During the sixteen years of Dr. Withycombe's administration, the Station work was characterized by rapid growth and efficient service. The development of the Station during these years is indicated by the fact that in 1898 there were five departments, with a staff consisting of ten members and an annual income of $15,900, including the Federal appropriation of $15,000 and the receipts from sales of farm products; while at the present time there are nine different departments at the home station, and seven branch stations maintained in different sections of the State, with a staff of 45 and an annual income from all sources of more than $104,000. In addition, a large number of experimental and demonstration plots are maintained cooperatively with farmers and fruit-growers.

Work Adapted to State Needs.

From the beginning of his administration, Dr. Withycombe placed special emphasis upon the importance of making the Station work of the greatest possible immediate practical value. It was his policy in the development of the Station to utilize the available resources for the investigation of problems peculiar to Oregon, leaving the larger problems of general application to the more wealthy stations of other states. He recognized that the problems confronted by the farmer and orchardist varied widely in different sections of the State, according to soil and climatic conditions, and as early as 1899 a tract of land was leased in a typical section of Eastern Oregon for the purpose of carrying on work adapted to the conditions in that region. It was in pursuance of this policy of adapting the work of the Station to the varying needs of the State that permanent branch stations were later established, from time to time, as conditions warranted and funds were available.

Diversified Agriculture Advocated.

Throughout the entire period of his administration, Dr. Withycombe has been an enthusiastic advocate of the importance of applying scientific principles in agriculture, and of following the most up-to-date methods in the improvement of the farm and the farm home. He has wielded a potent influence in breaking down prejudice against so-called book farming, and in inspiring confidence among the people in the value of agricultural education and the work of the Experiment Station. He has emphasized the fundamental importance of diversified agriculture, the restoration and conservation of soil fertility, the rotation of farm crops, and particularly of the dairy and livestock industry in the establishment of a permanent and successful agriculture.

Through the farmers' institutes Dr. Withycombe has been brought into touch each year with many thousands of people throughout the State; and by his optimistic, devoted, and efficient service, has led in the movement for improving the conditions of rural life in this State. In leaving the Station, he carries with him the cordial good will of the entire College community.

Dean Cordley Made Director.

Upon the resignation of Dr. Withycombe, Dean A. B. Cordley, of the School of Agriculture, was elected Director, the Board of Regents having decided to combine the offices of Dean and Director, thereby centering in one official the administration of both research and resident instructional work. There has been no particular change, however, in the general policy of the Station. The different projects have been continued on much the same basis as reported for the preceding biennium, with such changes only as may have been required by the completion of certain work or by its adaptation to changed conditions.

The Experiment Station comprises what is known as the home Station at the College and seven branch stations. The work of the home Station includes different projects provided for by the Federal Government under the Hatch and Adams Acts, and also serves as the center from which the special work is done under the State law providing appropriations for miscellaneous agricultural research

What the Station Comprises.

work and for crop and fruit pest and horticultural investigations. At this station also are centered the different scientific laboratories, with the necessary facilities for the extensive analyses and determinations required in most of the work at the different stations and elsewhere throughout the State. The branch stations include the Eastern Oregon Station at Union, the Umatilla Station at Hermiston, the Dry-Farm Stations at Moro, Sherman County, and Burns, Harney County, the Southern Oregon Station at Talent, Jackson County, the John Jacob Astor Station near Astoria, Clatsop County, and the Hood River Station in Hood River County.

Station Work Specialized.

With the home Station at Corvallis and the branch stations, the agricultural research work is now organized and distributed over the State in a way such as to make it of the greatest possible value. Altogether, these stations represent eight different distinctive agricultural regions of the State. The home Station, for instance, while doing the work in such subjects as bacteriology, plant pathology, and agricultural chemistry, that may have equal value in different sections, regardless of climatic or other conditions, represents in its local special work, particularly in the field, the agriculture typical of the Willamette Valley. The work of the Union Station is adapted to the particular needs of the large territory in Eastern Oregon in which livestock, the cereals, and forage crops constitute the principal agricultural interests. Likewise, the station on the Umatilla project is devoted primarily to the work of subduing the soils and solving the irrigation, horticultural, and other problems peculiar to the district in which it is located. The dry-farm stations at Moro and Burns are chiefly concerned with questions involved in successful dry-land farming in the semi-arid regions of Central Oregon. While in certain respects the dry-land investigations have to do with the same general problems, the differences in altitude, annual precipitation and other conditions peculiar to the two sections, give to each of these stations its special field with its own peculiar problems. The Southern Oregon Station at Talent, on the other hand, represents in its work conditions typical of the Rogue River Valley, and is concerned largely with the investigation of problems encountered in the development of the fruit industry of that section. In the Hood River Valley, again, though fruit is the principal product, conditions are quite different in many respects from those obtaining in the Rogue

River Valley and the other districts mentioned, and in order to solve the problems peculiar to that section the Hood River Station is maintained. Then, there is the branch station in Clatsop County, representing conditions typical of the coast country, in which dairying is the chief agricultural industry.

While each of the stations is devoted to the particular work of the greatest importance in the region represented, the results obtained are utilized elsewhere to the extent that they may be found of value. The work of all the stations, moreover, is planned so as to avoid all unnecessary duplication, thereby making possible the best use of the available funds in obtaining results in the aggregate of the greatest value to the entire State. In addition to the strictly research and investigational work, very valuable results are also being obtained from cooperative experimental and demonstration work with the farmers and orchardists. The work of the Experiment Station throughout all its departments is thoroughly organized and is of undoubted and far-reaching value. There are many experiments, indeed, as shown in the reports mentioned above, any one of which exceeds in value each year many times the entire cost of the experimental work.

Value of Experiment Station Work.

Although great improvement has been made during the biennium in the facilities provided for station work, there are still urgent needs that cannot be met from the present income. The Federal appropriation under the Adams Act is not available either for administrative work or for the publication of results obtained, but must be used for strictly investigational work, and the funds received under the Hatch Act are also narrowly limited in their application. The demands upon the Station also for expert assistance throughout the State are increasing at such rate that it is impracticable fully to meet these demands from the State appropriations provided for agricultural research and investigation.

Restriction of Funds.

As Director Withycombe says: "One of the most pressing needs of the Station at this time is a fund for Station publications. There is a great deal of valuable accumulated experimental data that should be in the hands of farmers, but the funds of the Station available for such purposes are not adequate to publish this information." It is of great importance that as the work progresses the results obtained be published and distributed for the use of the farmers. As urged by the

Publication Fund Required.

Director, there should be provided a special publication fund. Since no other funds are available for this purpose, an annual appropriation of some four or five thousand dollars should be secured for Station publications. This would relieve somewhat other Station funds, now used for publications but badly needed for other purposes, and would greatly enhance the value of the Station work.

Land and Buildings Needed.

There is still great need for additional land. Through the purchase of the south farm, provision was made for the poultry-breeding plant, for the experimental and instructional orchards, and for certain work also in animal husbandry. Notwithstanding this, however, it is necessary to lease between three and four hundred acres of land in providing for the maintenance of the flocks and herds and for the experimental and demonstration work. While the rental does not exceed the interest value of the land, perhaps, still it is of the utmost importance that the necessary lands be purchased as soon as practicable, in order that the farms may be properly improved and the work planned on a permanent basis.

As explained elsewhere in this report, there is also great need for additional room. Among the buildings most needed at the present time in the agricultural work are the sheep barn, the hog barn, the veterinary laboratory, and the feed and seed storage building, with the necessary equipment and miscellaneous improvements required in connection therewith. These will be provided as rapidly as possible from the millage-tax income.

COLLEGE EXTENSION.

Development of Extension Work in Oregon.

In his biennial report for 1907-08, the President of the College discussed the development of agricultural extension work in the land-grant colleges throughout the United States, and emphasized the importance of the Oregon State Agricultural College's enlarging its activities in this field. In his report for 1909-10 the subject was given further consideration. It was urged that in order properly to develop this phase of College service there should be organized an extension division coordinate in rank with the Experiment Station and the departments of resident instruction. No funds for this work, however, were available, except an appropriation of $2,500 a year for farmers' institutes. This, of course, was entirely inadequate, not being sufficient even for the traveling expenses of the members of the faculty and Experiment Station staff who conducted institute work incidental to their regular duties. A special appropriation of $5,000 a year was therefore requested from the State legislature. But at that time the members of the legislature were not convinced of the importance of the extension work and no appropriation was provided.

Again, in 1913, in his report for the preceding biennium, the President of the College explained the great advancement that had been made in different states in organizing and developing various agencies for extension service. He emphasized the absolute necessity without further delay of making adequate provision for this work in Oregon. The following in regard to the importance of the work is taken from that report:

Importance of Extension Work.

"Probably the greatest pressing demand to which the College is not prepared to respond is for demonstration and other forms of extension work. Notwithstanding the remarkable growth of resident work, the demand for trained men in scientific agriculture, for instructional and research positions in agricultural colleges and experiment stations, as instructors in high schools, and as superintendents or managers of large orchards and farm properties, is far in excess of the number of people qualified for these various positions. As such demands increase and become more persistent, the agricultural courses at the College will attract correspondingly larger numbers of the more capable and ambitious students. But with the development in agricultural education of collegiate grade has come, during the later years, a great awakening among the people to the importance of disseminating up-to-date knowledge in usable form directly among the farm population. Whatever be the achievements in the discovery of new scientific truths, or their value as applied in agriculture, or to whatever extent the relatively few who are able to enjoy the advantages of college training may master the basic principles upon which rests a stable and successful agriculture, the great problems confronted in the general betterment of rural life conditions can be solved only in the open country, out on the farms and in the homes of the people who are in daily contact with these problems. Hence the demand, now nation-wide, for extension work." (Page LXI.)

Cooperative Work Planned.

During the year 1912 negotiations had been taken up with the officials of the United States Department of Agriculture regarding cooperative extension work by the Department with the Agricultural College in this State. Tentative arrangements had been made for such cooperation in dairying and farm management, contingent, however, upon securing the necessary legislation from the Oregon legislature. It was strongly urged, therefore, that the required legislation be secured at once, and that such legislation should be sufficiently comprehensive to make it possible to utilize every available resource in promoting the development of this important work. Accordingly, at the session of the State legislature in 1913, a measure was introduced providing for the extension service as recommended by the Agricultural College. This measure was strongly supported by different organizations throughout the State, and was finally passed by practically a unanimous vote.

Oregon Extension Law.

Under this act, which is fully explained in the appended report of the Director (page 42), the State makes a direct appropriation for the general support of extension, and, within certain limitations, duplicates county appropriations for county agricultural work and appropriations by the Federal Government for cooperative extension work in Oregon. This law was regarded at the time as probably the best and most comprehensive of the kind in the United States, providing as it does for cooperation in extension work between the College, the State Department of Education, the different counties, and the Federal Government. This act, in part, anticipated certain congressional legislation, thereby placing Oregon in a position to utilize any possible assistance that might come from the Federal Government for extension work.

Cooperative Agreement.

The extension legislation was completed in 1914, as explained elsewhere in this report (page VII), upon the passage by Congress of an act providing appropriations to the several states for cooperative extension work in agriculture and home economics. This act is administered on the part of the Government by the Department of Agriculture. In furtherance of the plan provided for in the State and Federal laws, the Secretary of Agriculture and the President of the Oregon State Agricultural College signed a memorandum of agreement on August 3, 1914, in which occurs the following:

> "The United States Department of Agriculture agrees:
>
> * * * * * * * *
>
> (b) To conduct in cooperation with the Oregon State Agricultural College all demonstration and other forms of extens on work in agriculture and home economics which the Department is authorized by Congress to conduct in the State of Oregon."

This agreement is of great importance, as it insures complete cooperation between the Government and the College in all extension activities in the State of Oregon.

The Extension Division of the College had been organized in November, 1911. During the intervening years the extension work had been developed to the extent possible with the funds available, through members of the faculty and Experiment Station staff who devoted as much time to this work as could be spared from their regular duties. At the time of the passage of the State Extension Law, therefore, and the Smith-Lever Act of Congress, the College was in a position to enter at once upon the larger field of extension service. Although the farmers' institutes that had been inaugurated some twenty years before were continued to the extent thought advantageous, greater emphasis in the new plan was placed upon the work of the county agriculturists, the itinerant schools, the boys' and girls' industrial clubs, and upon farm management, marketing, and organization.

New Extension Projects.

A summarized statement from the Director's report shows that during the biennium, though the Smith-Lever Act had been in force only six months, and the extension act of the State legislature about a year and a half, more than two hundred thousand people in the State had been reached by different forms of the College extension service. Of these, 5,290 had attended Chautauqua lectures; 41,976, farmers' institutes; 56,454, special institutes and lectures; 5,547, teachers' institutes; 16,268, movable schools and itinerant short courses; and 11,850, special demonstrations and lectures; while more than 12,000 boys and girls had been enrolled in the industrial club work, and some 75,000 had participated in the preparation of industrial exhibits for school fairs. In addition, besides many thousands of personal letters written by members of the College staff, 72 bulletins were published by 29 different members of the College faculty, numbering 341,900 copies, with an aggregate of 6,087,260 pages.

Extension Statistics.

The Extension staff numbers 44, of whom 28 give their entire time to the extension service, and 16 divide their time between extension work and resident instruction or agricultural research. In addition, other members of the faculty, though receiving their salaries from other funds, devote more or less time to extension work incidental to their regular duties.

A more complete statement of the plan of organization and the extent and character of the extension work, with an outline of the different projects, will be found in the appended report of Director Hetzel.

COLLEGE FINANCES

In the appended report of the College Treasurer will be found in detail an account of the receipts and expenditures during the biennium. For resident instruction and the home Experiment Station the report is for the two years, July 1, 1912, to June 30, 1914; and for the branch experiment stations, the crop pest and scientific investigational funds and the extension service, for the calendar years 1913 and 1914. These reports include all funds from whatever source obtained, although under an act of the State legislature passed in 1913, the College Treasurer is responsible for only the Federal appropriations and certain special funds.

The work of the Agricultural College is organized into three main divisions, each of which, as explained on a preceding page (VII), is financed entirely independently of the other two, except that appropriations for buildings, land, and equipment are used in providing the necessary facilities for the work of the entire institution. These divisions include the regular resident instructional work in course at the institution, the agricultural experimental and research work, and the extension service. Separate reports, therefore, of the receipts and expenditures are submitted for each of these divisions. From these reports it will be seen that there are four principal sources of income.

I. *The Federal Government:*

1. Land Grant Act of 1862, for instructional purposes.
2. Morril Act of 1890, for instructional purposes.
3. Hatch Act of 1887, for agricultural experimental work.
4. Adams Act of 1906, for agricultural experimental work.
5. Nelson Amendment of 1907 to the Morrill Act of 1890, for instructional purposes.
6. Smith-Lever Act of 1914, for extension work in agriculture and home economics.
7. Department of Agriculture for cooperative experimental work in agriculture.
8. Department of Agriculture for cooperative extension work in agriculture and home economics.

II. *The Oregon State Legislature.*

III. *Oregon Counties.*

IV. *Student Fees, Miscellaneous Sales, Etc.*

Segregated, the amounts received for the year 1914 from the different sources indicated are as follows:

I. *From the United States Government:*

1. *For instructional purposes, annually—*

Act of 1862—Interest on Land-Grant fund, approximately		$11,000	
Act of 1890		25,000	
Act of 1907		25,000	$ 61,000

2. *For experimental purposes, annually—*

Act of 1887		$15,000	
Act of 1906		15,000	
Department of Agriculture—			
Dry-farming stations in Harney and Sherman counties		4,600	
Irrigation station on Umatilla Irrigation Project at Hermiston		3,000	$ 37,600

3. *For extension work, annually—*

Smith-Lever Act		$10,000	
U. S. Department of Agriculture—			
Farm management	$3,440		
Dairy demonstrations	2,500		
Industrial clubs	900		
Farm surveys	500		
Hog-cholera demonstrations	150	7,490	$ 17,490

II. *From the Oregon State Legislature:*

1. *For resident instructional purposes, annually—*

*Section 4260, Lord's Oregon Laws		$80,000	
*Chapter 90, General Laws for 1911		70,000	
*Chapter 210, General Laws for 1913		50,000	$200,000

2. *For experimental purposes, annually—*

(a) Home Station—			
For crop and fruit pests and horticultural problems, annually	$15,000		
For other agricultural investigations	10,000	$25,000	
(b) Branch Stations—			
Eastern Oregon, at Union	7,500		
Umatilla, at Hermiston	3,000		
Sherman County, at Moro	2,500		
Harney County, at Burns	4,000		
Southern Oregon, at Talent	5,000		
Clatsop County, at Astoria	3,000		
Hood River County, at Hood River, for 1913 and 1914	3,000	$28,000	$ 53,000

3. *For extension service, annually—*

Farmers' institutes		$ 2,500	
Educational extension		25,000	
Cooperation with U. S. Department of Agriculture—			
Farm management	$ 3,440		
Dairy demonstrations	2,500		
Industrial clubs	900		
Farm survey work	500		
Hog-cholera control	150	7,490	
Cooperation Oregon counties—			
Coos County	$ 1,500		
Crook County	1,500		
Harney County	2,000		
Jackson County	2,000		
Klamath County	1,500		
Lane County	1,500		
Marion County	1,500		
Malheur County	1,500		
Tillamook County	1,500		
Union County	1,500	*16,000	$ 50,990

4. *For buildings, improvements, repairs, library books and periodicals, purchase of land, equipment, etc.,* for institutional use—instruction, research, extension, —for two years, Chapters 209-211, General Laws for 1913, $249,000; for year 1914 ....$124,500

III. *From Oregon Counties, annually:*

1. *For maintenance of county agriculturists in duplication of state appropriation—*

Coos County	$1,500	
Crook County	1,500	
Harney County	2,000	
Jackson County	2,000	
Klamath County	1,500	
Lane County	1,500	
Marion County	1,500	
Malheur County	1,500	
Tillamook County	1,500	
Union County	1,500	$16,000*

2. *For Experiment Station at Hood River—*

Hood River County	2,000**

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*This is the total of the annual rate of the county appropriations. In some cases the work was not inaugurated until late in the year, and the actual receipts would therefore be less than the amount here given.

**The state appropriation for experimental work in Hood River County is $3,000 for each of the years 1913 and 1914, with the stipulation that the county appropriate $2,000.

IV. *From Miscellaneous Sources:*

1. *For resident instructional purposes, annually—*		
From student fees and departmental sales		$10,104*
2. *For experimental purposes, annually—*		
From sales of farm products, approximately—		
(a) Home Station	$ 7,653	
(b) Branch Stations	12,745	20,398**

The distribution of the income for 1914 for Resident Instruction, the Experiment Station, and the Extension Service is as follows:

I. *For instructional purposes—*			
1. From U. S. Government		$ 61,000	
2. From Oregon State Legislature		200,000	
3. From miscellaneous sources, approximately		10,104	$271,104
II. *For experimental purposes—*			
1. From U. S. Government		$ 37,600	
2. From Oregon State Legislature		53,000	
3. From Oregon Counties		2,000	
4. From miscellaneous sources—			
Home Station, approximately	$ 7,653		
Branch stations, approximately	12,745	$ 20,398	$112,998
III. *For extension work—*			
1. From U. S. Government		$ 17,490	
2. From Oregon State Legislature		50,990	
3. From county appropriations		16,000	†$ 84,480
IV. *For buildings, improvements, land, equipment—*			
1. From Oregon State Legislature (See ¶4, page XLII)			$124,500

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*Student laboratory fees and deposits amounted during the year in the aggregate to $17,760.55. These, however, are used for the purchase of student supplies required in laboratory, shop, and other work, and are, therefore, not included in the report of income for College support.

The receipts from farm sales also amounted during the year to $7,525.20. These consisted largely merely of a transfer from one department to another, as in the case of feed grown under the direction of the Department of Agronomy and used for the maintenance of livestock in the Department of Animal Husbandry. Animals may be bought also for special purposes, as during the farmers' week of the winter short course, and paid for from the receipts of sales at the close of the period for which the animals are purchased; also receipts from dairy products are used for the purchase of milk and cream required in the manufacture of butter and cheese. Although these different items are of record, the same as other receipts and expenditures, and are handled under the same regulations, they are omitted here as in the case of student laboratory and incidental fees, as they do not constitute an available resource for the support of the institution.

**These include only receipts from the regular departmental sales, but do not include mere transfers from one department to another.

†See note, page XLII.

Reference has already been made in this report (page VI) to the necessity of having a permanent income for institutions of higher learning, and to the provisions that have been made by the State legislature for the financial support of the Oregon State Agricultural College.

Disadvantages of Millage Tax.

The relative merits of different methods of financing educational institutions were discussed at considerable length in the biennial report for 1910-12. The value of an annual statutory levy was explained; also the uncertainty of this method, particularly in the newer states where the conditions are more or less unsettled and there is lack of a definite policy in evaluating state property for taxation. It was shown that in some states the assessed valuation of state property had varied as much as 50 per cent in a single year, while for the same period the variation in student enrollment in the institutions of higher learning had been only 25 per cent. In some cases, while there had been large increase in the tax levy, there had been an actual decrease in the number of students. Generally, however, the increase in student enrollment had been in excess of the increase in state valuation.

The Oregon State Tax Commission had estimated that the future increase in this state in the valuation of taxable property should be about four per cent each year. As pointed out at that time, however, the average increase during recent years in the number of full-year students at the State Agricultural College had been about 17 per cent. It was urged, therefore, that great care should be exercised in any attempt that might be made in Oregon to provide for the permanent financial support of the higher educational institutions.

Reduction in College Income.

That there was justification in this warning is shown by the development of the past two years. In 1913, at the time of the passage of the millage-tax laws providing for the support of the State University and the State Agricultural College, the State Tax Commission estimated that the tax valuation of state property for Oregon for 1914 would be one billion dollars, an increase of forty-six million dollars over the preceding year. As a matter of fact, however, there was an actual decrease from $954,000,000 in 1913, to $932,000,000 in 1914. The result is a reduction in the income of the Agricultural College below what was estimated for resident instruction for the year 1915 by more than $27,000. The indications are, moreover, that there will be a further decrease in 1915, with a corresponding additional reduction in the College income for 1916.

Change in Fiscal Year.

In the report submitted to the Secretary of State under date of December 10, the estimated income for 1915 was based upon the assumption that the entire levy for 1915 would be available for that year. It has since developed, however, that while the levy was made for 1915, only three-fourths of it will be available for the year 1915, covering the period from April 1 to December 31, the remaining fourth having to be carried over for the period January 1 to April 1, 1916, when the first payment for 1916 becomes due. The income under this law, therefore, while levied for the calendar year, will be available for the period April 1 of one year to March 31 of the following year. The effect of this upon the Agricultural College finances, in connection with the reduction in valuation of state property, is to reduce the net income for the calendar year 1915 below the amounts estimated at the time of the passage of the mill-tax law in 1913 by more than $120,000.

No Special Appropriation Requested.

It has been determined by the Board of Regents, however, that the expenditures shall be kept within the income. This can be accomplished only by suspending for the time being all building and improvement operations. The necessity for this is most unfortunate. There is urgent need for additional room, and many improvements also should be made without delay in properly caring for College property and providing for the work of different departments. In spite of these conditions, however, no special appropriation will be requested from the State legislature with which to meet this emergency. The most possible will be made of the situation, and the funds available used to the best advantage in meeting the requirements of the institution.

The following statement shows the income from the State for resident instruction, including buildings and improvements, for the years 1913 and 1914, and the estimated income for the years 1915 and 1916:

	1913	1914	1915	1916
1. *Continuing Appropriations for Current Expenses—*				
*Sec. 4260, Lord's Oregon Laws..	$ 80,000	$ 80,000	$ 20,000**	......
*Chap. 90, General Laws 1911.....	70,000	70,000	17,500**	......
*Chap. 210, General Laws 1913....	50,000	50,000	12,500**	......
2. *Special Appropriations—*				
Improvements and repairs, extension of heating system, remodeling of Science Hall, library books and periodicals, as provided in Chapter 209, General Laws for 1913***....	41,000	41,000	......	......
Buildings, as provided in Chapter 211, General Laws for 1913***...	53,500	53,500	......	......
Equipment as provided in Chapter 217, General Laws for 1913***...	30,000	30,000	......	......
3. *Millage Tax—*				
Chapter 136, General Laws for 1913. For current expenses, or general maintenance, buildings, improvements and repairs, equipment, library books, land, etc.	......	......	279,600†	372,800†
Total	$324,500	$324,500	$329,600	$372,800

Increase in Student Enrollment.

From the above it will be observed that the income for 1915 will be practically the same as for each of the preceding two years, notwithstanding the large increase in student enrollment and the necessity occasioned thereby for additional instructors and other facilities required in providing for efficient work. The increase in regular matriculates, or full-year students, in 1913 over 1912 was more than 18 per cent; in 1914 over 1913, 15 per cent. There no doubt will be a substantial increase in student enrollment during the next biennium, though on account of the advancement in the standard, the rate of increase may not be so great as during the preceding two years.

Comparative Income and Enrollment.

In this connection a statement showing the relative growth in income and student enrollment during recent years is significant. A table compiled from the reports of the Registrar and the Business Office shows that while the increase in income for 1912 over 1911 for resident instruction, including special appropriations for buildings and other improvement, was 14 per cent, the increase in student enrollment was 18 per cent. For 1913 over 1912, the increase in income was 5 per cent; in student enrollment, 18 per cent. Finally, for 1914 over 1913 the increase in income was only 7/10 of one per cent, while the increase in student enrollment was more than 15 per cent.*

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*These laws were repealed in Chapter 136, General Laws for 1913, to take effect April 1, 1915.

**One-fourth annual appropriation, January 1 to March 31, 1915.

***These appropriations were for the biennium. For convenience they are divided equally between the two years.

†This appropriation becomes available when taxes are collected in April, 1915. The estimate is on the basis of a state valuation of $932,000,000.

In the table on the preceding page giving the comparative income from the State for each of the years 1913 and 1914 and the estimated income for 1915 and 1916, it will be observed that the income for each of the first two years is the same, with an increase of $5,100 for 1915. These totals, however, are given for the calendar year, whereas College budgets must, of necessity, be made for the school year, July 1 to June 30. As a matter of fact, the total income for resident instruction for the school year 1914-15 is 21 per cent LESS than the income for the preceding year.**

Additional Instructors Needed.

With an enrollment such as the College now has, the cost per student from year to year remains essentially the same. As the number of students increases, if the standard of efficiency be maintained, there must be corresponding increase in income for instructors, room, and other facilities. As indicated above, the increase in enrollment during recent years has been relatively far greater than the increase in income. It is obvious, therefore, that in caring properly for the work of 1915 and 1916, there must be a large increase in the instructional force and in other items of maintenance. Not only is it necessary that the College staff be increased, but there must also be some increase in the salaries of present employees. No general increase in salary is contemplated, but conditions are such that in order to maintain the present efficient organization, and prevent the loss to other institutions of a number of the faculty occupying important and responsible positions, some increase in salary cannot be avoided.

In preparing the budget for the next biennium the estimates of the various heads of departments have been reduced to a minimum. In the outline herewith submitted, details of which may be found in the Appendices, pages 116-120, an allowance of 11 per cent of the salary budget for 1914 is made for additional instructors, and

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*Regular full-year students only are included, no account being taken of attendance at summer school and the winter short courses.

**The income from all sources for resident instruction for the year 1913-14 was $394,500, while the income for 1914-15 is $312,500. The latter amount includes $150,000 continuing appropriation for the nine months. July 1, 1914, to March 31, 1915, and $93,000, the income under the millage-tax law for the three months, April 1 to June 30, 1915. The balance of the income is from the Federal Government and miscellaneous receipts.

Estimates Reduced to Minimum.

about five per cent for increase in present salaries. There is also the required allowance for increase in general maintenance, including care of buildings, heating, light and power, etc. In each case the increase is the minimum consistent with efficient service. From these estimates it is apparent that for 1915, at least, the maintenance requirements will be such as to preclude the possibility of any building operations during this year. Indeed, further arbitrary reductions will need to be made in the amounts allowed for repairs, improvements, and equipment, aggregating some $10,000, in order that the estimated expenditures may be brought within the income, with a proper allowance for contingent expenses.

The following is the estimated income for 1915 from all sources for resident instruction, including salaries, care and heating of buildings, light and power, publications, repairs, equipment, library books and periodicals, land, and permanent improvements, such as new buildings, construction of drives, walks, etc.:

Continuing appropriation, January 1 to March 30, 1915	$ 50,000	
Millage tax, April 1 to December 31	279,600	
Morrill fund	50,000	
Land-grant interest	11,500	
Miscellaneous, including student entrance fees but excluding shop and laboratory fees and receipts from sale of farm products*	10,000	$401,100

The estimated requirements for 1915, based upon the actual expenditures for the preceding year, are as follows:

1. *Salaries*—		
On basis of 1914**	$236,243	
Estimated additional salaries, 1915	27,570	
Increase in present salaries (5%)	12,750	$276,563
2. *General Maintenance*— Including salaries, care of buildings, heating, light, power, water, publications, etc., but excluding shop and class student supplies***		69,100
3. *Repairs*— Including necessary repairs to buildings, painting, refinishing floors, repairing plastering, refitting doors and windows, repairing roofs, down-spouts, etc.		9,353
4. *Improvements*— Including walks, drives, equipment for fire protection, etc.		9,840

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*See note, page XLIII.

**This does not include salaries of employees on the College farms, as these are covered by receipts from farm sales, nor of those in the service departments given under "General Maintenance."

***The cost of supplies required in laboratory, shop, and other departmental work is not included here for the reason that these supplies are paid for from student fees not included in the statement of estimated income.

5. *Library*—	
Including library books and periodicals	7,500
6. *Equipment*—	
Departmental equipment, including scientific apparatus, livestock, machinery, desks, cases, etc.	30,000
	$402,356

The estimated income for the year 1916 aggregates $445,300 as follows: Millage tax $372,800, Federal Government $50,000, land-grant interest $11,500, miscellaneous $11,000.

Income for 1916.

Exclusive of buildings, the expenditures for the year 1916, on the basis of 1915, as summarized above and given more in detail in the Appendices, would amount, in round numbers, to $426,000. This allows between three and four thousand dollars for increase in miscellaneous items of expense and $19,900 for additional instructors, including about three per cent for increase in salaries. The amounts included for repairs, improvements, equipment, and library books and periodicals are the same as for 1915. On this basis there would be a balance of approximately $19,000 for new buildings.

Building Fund Increased.

The need for additional room is such, however, particularly in view of the fact that no money will be available for new buildings in 1915, that it would seem imperative that the original budget for the biennium be so readjusted as to secure a larger amount for buildings in 1916. Since the miscellaneous items of maintenance expense cannot be reduced, and the allowance for instructors is the minimum consistent with efficient work, the only way this can be accomplished is by reducing the amounts originally allowed for improvements, repairs, library books, and equipment. These latter are all as low as they should be, but the relatively greater demand for room would seem to justify the change. By omitting all permanent improvements and including only such repairs as are necessary in keeping up College property, and allowing only for incidental items of equipment and the amounts required for periodicals for the library and for necessary binding, these items could be reduced from the amounts given to the following: Improvements and repairs $7,000, Library $5,000, equipment $12,000. In this way the amount available for buildings during the year 1916 could be increased to approximately $52,000.

In this connection emphasis should be placed upon the fact that, notwithstanding the construction of new buildings during recent years, the growth of the College has been such that, with the corresponding increase in the requirements for maintenance, it will be impossible, depending upon the income from the millage tax, to provide room as rapidly as necessary in caring properly for the work of the institution.

Forestry Building Needed.

The work in forestry and logging engineering is crowded into two small classrooms and an office in Science Hall. These rooms are entirely inadequate and unsuitable. In fact, at the time the State legislature convened in 1913, the enrollment in forestry had grown to a point such that it was recognized that other provisions would have to be made for the forestry work, and the Pacific Logging Congress, realizing the importance of the work in promoting the forest and lumber interests of the State, had a bill introduced appropriating money for a Forestry Building. The legislature, however, did not deem it practicable to make the appropriation. Since then the number of students in forestry and logging engineering has increased more than 130 per cent. It is impossible to do successful work in the present quarters, and there is no room in any of the other buildings of the College to which it could be transferred. The Forestry Building is an immediate necessity.

New Library Imperative

In each biennial report during the past six years, emphasis has been placed upon the necessity of providing a Library Building. The Library occupies parts of the Administration Building, the oldest building on the campus. The books are stored in six classrooms on two different floors, and for practical purposes are largely inaccessible. The reading room, the largest in the building, has a maximum capacity of only 120 readers, although the College community aggregates, during certain seasons of the year, more than two thousand people. Furthermore, the building is unsafe. There are marked evidences of weakness, and should the building be longer used for library purposes, it will be necessary to brace it by rods and other means in order to hold it together under the heavy weight of books. The Library now contains more than 68,000 books and pamphlets. Nearly 10,000 volumes were added by gift and purchase during the past biennium. As stated by the Librarian in her report: "From the point of view of both service and storage, relief in the matter of housing the Library has become imperative."

A number of engineering departments, also, and the department of Physics, are in urgent need of more room. By adding a third story to Mechanical Hall, this building, with slight alterations, could be used for a number of years for the departments of Physics and Electrical Engineering. A few classrooms in this building would be available temporarily for civil and highway engineering. But a new building will be required, with large laboratory rooms especially planned for the work in experimental, hydraulic, gas, and steam engineering.

Several important though comparatively inexpensive buildings are also needed by different departments in Agriculture. These include a hog barn, a veterinary laboratory, a sheep barn, and a grain and feed storage building.

The large growth of the College and the extended organization required in the efficient management of its affairs have increased the administration work of the institution out of all proportion with the available room for it. A new Administration Building will be necessary in the very near future, or special provision must be made in other buildings for the administration work.

It is apparent, therefore, that the most rigorous economy will be necessary throughout all divisions of the College, in order that funds may be made available with which to provide additional room. Even then, a number of years will be required in securing buildings badly needed at the present time.

Building Plans for 1915, 1916.

Before it was known that the income for 1915 would be reduced, as explained on another page of this report, it was planned that two units of the Forestry Building and two or three of the smaller agricultural buildings should be provided in 1915, and that approximately $50,000 with which to start the Library Building would be available in 1916. It will now be necessary to defer building operations for a year. The building fund, furthermore, will be smaller than originally contemplated. But by following the plan indicated above for increasing the building fund for 1916, it is expected that one unit of the Forestry Building and one or two small agricultural buildings can be provided during that year. It is hoped that in 1917 a start, at least, can be made on the Library Building. However, some additional laboratory space must in some way be provided during these years for the engineering work.

By the end of the next biennium the transition period in the change from the old to the new system of financing the College will have been passed, and it is hoped that the institution thereafter will be on a permanent and more satisfactory financial basis. The Experiment Station and the Extension Service are financed by continuing annual appropriations provided by the Federal Government and the State, and the mill-tax law, enacted in 1913, should, in time, prove a reasonably satisfactory method of providing funds for resident instruction. Although the present income is inadequate to meet the requirements of the College, particularly for new buildings, it is the policy of the College authorities to use the funds provided in a way best adapted to the varying needs of the institution.

Permanent Financial Basis.

Respectfully submitted,

W. J. KERR.
President of the College.

January 12, 1915.

REPORT OF
THE SCHOOL OF AGRICULTURE AND AGRICULTURAL EXPERIMENT STATION

To the President of the College,

Sir: The Board of Regents, by increasing the requirements for admission to our degree courses, providing for Vocational courses, and centralizing the administration of the School of Agriculture and the Experiment Station in one office, have made it possible materially to raise the standard of our courses of study and to bring about a closer coordination of the instructional and investigational work in Agriculture.

THE SCHOOL OF AGRICULTURE.

In previous Biennial Reports I have called attention to the almost phenomenal growth of the School of Agriculture, and I am pleased to be able to report again that this rapid development has continued throughout the present biennium. I am also glad to report that the growth in attendance has been accompanied by a corresponding increase in faculty, in improved facilities, in a general betterment of our instructional work, and a wider recognition of the facilities offered by this institution for graduate work. The last statement is suggested by the fact that the number of graduate students in Agriculture has increased during the biennium approximately 120 per cent. The increase in number of students and faculty in the School of Agriculture from 1906-07 to 1914-15 is shown in Table I.

Table I. Increase in No. of Students and Faculty in School of Agriculture 1906-07 to 1914-15.

	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15*
Long Course	80	109	187	218	237	303	429	496	493
Short Course	56	70	130	420	407	1432	1057	919	
Faculty	8	14	19	22	25	28	30	44	48

Courses of Instruction. Advantage was taken of the opportunity provided by the increase in entrance requirements completely to revise and standardize the courses of instruction. Since these courses are fully described in the College catalogue, however, any detailed description of them at this time seems unnecessary. In general, it may be stated that the work of resident instruction in Agriculture is grouped into the following courses:

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*To October 27, 1914, only.

1. Vocational Courses in Agriculture
    - a. General Farm Practice (1 yr.)
    - b. Dairy Production (1 yr.)
    - c. Dairy Manufacturing (1 yr.)
    - d. Animal Husbandry (1 yr.)
    - e. Horticulture (1 yr.)
    - f. Poultry Husbandry (1 yr.)
2. Degree Course in General Agriculture (4 yrs.)
3. Degree Courses in Agronomy
    - a. General Agronomy (4 yrs.
    - b. Soils, Specialized Course (4 yrs.)
    - c. Crops, Specialized Course (4 yrs.)
    - d. Irrigated Farming (4 yrs.)
    - e. Farm Management (4 yrs.)
4. Degree Courses in Animal Husbandry (4 yrs.)
5. Degree Courses in Dairy Husbandry
    - a. Dairy Production (4 yrs.)
    - b. Dairy Manufacturing (4 yrs.)
6. Degree Courses in Horticulture
    - a. Pomology (4 yrs.)
    - b. Olericulture (4 yrs.)
    - c. Floriculture (4 yrs.)
    - d. Landscape Gardening (4 yrs.)
7. Degree Course in Poultry Husbandry (4 yrs.)
8. Degree Course in Agricultural Chemistry (4 yrs.)
9. Degree Course in Agricultural Bacteriology (4 yrs.)
10. Degree Course in Economic Entomology (4 yrs.)
11. Degree Course in Botany and Plant Pathology (4 yrs.)
12. Degree Course in Economic Zoology (4 yrs.)
13. Degree Course in Agriculture for Teachers (4 yrs.)
14. Graduate Work in Agriculture (2 yrs.)
15. Winter Short Course in (a) Agronomy, (b) Animal Husbandry, (c) Horticulture, (d) Dairying, (e) Poultry Husbandry, (f) Crop Pests (4 weeks)
16. Summer Courses in (a) Agronomy, (b) Animal Husbandry, (c) Dairy Husbandry, (d) Horticulture, (e) Poultry Husbandry (6 weeks)

In addition to the above work of resident instruction, the members of the staff of the School of Agriculture and the Experiment Station assist, under the auspices of the Extension department, in the exercises of Farmers' Week, in the various movable schools of Agriculture, in exhibiting and judging at State and county fairs and expositions, in delivering miscellaneous lectures, and in preparing general bulletins of information and press articles; they examine and report upon many miscellaneous samples and specimens, and conduct a correspondence aggregating more than 50,000 letters a year.

The Vocational Courses. Beginning with the year 1914-15, the old Secondary Courses have been discontinued, and Vocational Courses have been substituted. These one-year courses are provided especially for those who have had no opportunity to pursue their public school courses beyond the eighth grade, or who, from necessity or choice, desire, upon completing the work of this grade, to obtain as quickly as possible a working knowledge of the principles of agricultural practice. They are also open to students with one or more years of high school preparation, and to men of mature years and practical experience, who may desire to familiarize themselves with the most modern thought on this subject. Those who pursue the one-year course in Agriculture will have the opportunity of specializing in general farm practice, animal husbandry, horticulture, or poultry husbandry; and those who pursue the one-year course in Dairying will have the opportunity of specializing in Dairy Production or Dairy Manufacturing.

In this State there are thousands of young men who are to become our future farmers and orchardists. It is to the interest both of the individual and of the State that these young men should keep pace with the rapid development of agriculture. Each and every one should have, if possible, the opportunity of obtaining an agricultural education. Many of them are so situated, however, that it is impossible for them to attend any of our regular four-year courses. There are also many mature men well past the usual school age, no doubt, who desire to acquaint themselves more fully with the more recent developments in agricultural science and practice. There are also youths in various localities of the State whose high schools offer none of the agricultural training that they desire to undertake. It is to meet the needs of such men, both young and old, that these one-year courses are offered. They are designed to provide the largest amount of practical information and training that can be given in one year. The Vocational work in Agriculture offered during the first year totals 81 semester credit hours.

The Degree Courses. The various degree courses in Agriculture are open during the year 1914-15 only to those who have completed the equivalent of at least three years of the Oregon State high school course; in 1915-16, and thereafter, they will be open only to those students who have completed the full four-years' course of a State high school. The aim of these degree courses is to train young men to become successful farmers, stockmen, and fruit growers; to equip them to become efficient managers of orchard and ranch properties and of agricultural and cooperative organizations; to prepare them to become specialists in some branch of agricultural college or experiment station work, or to fit them to become teachers of agriculture in the public schools. In short, they offer to those who have faith in the farm and in rural life, opportunities for individual development and technical training equal to those provided for the educated in other professions.

Including the courses in Agricultural Chemistry, which are provided in the department of Chemistry, there are given by the departments of the School of Agriculture a total of 227 courses of instruction, with a total of 659 semester credits. This is an increase during the biennium of 14.6 per cent in the number of courses of instruction offered and of 25.23 per cent in the number of semester credits. This increase in the number of semester credits given has also been accompanied by a large increase in the amount of work required for each credit. It should also be noted that, owing to the large number of students in many of the courses —particularly those of the Freshman and Sophomore years, we have been compelled to maintain five sections, thus further increasing the instructional requirements. In fact, the semester credits of all sections of all courses make a total of 864 instead of 659 as shown in the above percentage increase.

Changes in the faculty of the School of Agriculture and the Experiment Station since July 1, 1913, including resignations, promotions, and additions to the staff, are given below. Since the complete list of the present staff is included with the members of the faculty listed elsewhere in this publication, the names are not listed in the report of this School.

Resignations.

M. M. McCool, Assistant Professor of Soil.

Lyman Bundy, Research Assistant in Agricultural Chemistry.

H. E. Ewing, Research Assistant in Entomology.
J. M. Speidel, Instructor in Horticulture.
V. I. Safro, Research Assistant in Entomology.
G. H. Godfrey, Research Assistant in Plant Pathology.
A. M. Woodman, Orchard Foreman.
F. C. Bradford, Research Assistant in Horticulture.
*C. C. Lamb, Foreman Poultry Plant.
B. W. Hollis, Instructor in Veterinary Medicine.
E. P. Walls, Instructor in Botany.
A. F. Lafky, Orchard Foreman.
G. C. Ralston, Research Fellow in Horticulture.

Promotions.

A. B. Cordley, from Dean of the School of Agriculture to Dean of the School of Agriculture and Director of the Experiment Station.
C. I. Lewis, from Professor of Horticulture to Vice-Director of the Experiment Station and Professor of Horticulture.
G. F. Sykes, from Assistant Professor of Zoology and Physiology to Professor of Zoology and Physiology.
B. T. Simms, from Assistant Professor of Veterinary Medicine to Professor of Veterinary Medicine.
F. L. Griffin, from Associate Professor of Agricultural Education to Professor of Agricultural Education.
H. F. Wilson, from Assistant Professor of Entomology to Professor of Entomology.
A. F. Barss, from Research Fellow in Horticulture to Research Assistant in Horticulture.
J. E. Cooter, from Teaching Fellow in Agronomy to Instructor in Agronomy.
A. F. Vass, from Research Assistant in Bacteriology to Assistant Professor of Bacteriology.
C. C. Starring, from Research Fellow in Horticulture to Horticulturist of the Hood River Branch Experiment Station.

Additions.

C. H. Kennedy, Assistant Professor of Animal Husbandry and Secretary of the State Stallion Registration Board.
A. C. Chandler, Instructor in Zoology and Physiology.
D. C. Howard, Instructor in Dairy Husbandry.
Clara Nixon, Fellow in Poultry Husbandry and Agricultural Chemistry.
Ralph McBurney, Instructor in Bacteriology.
LeRoy Childs, Research Assistant in Entomology.
C. S. Brewster, Research Assistant in Poultry Husbandry.
R. M. Rutledge, Secretary to Dean and Director.
R. R. Graves, Professor of Dairy Husbandry.
I. H. Blake, Instructor in Zoology and Physiology.

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*Transferred to Extension Service.

W. M. Atwood, Instructor in Botany.
B. T. Simms, Assistant Professor in Veterinary Medicine.
O. M. Nelson, Instructor in Animal Husbandry.
G. D. Horton, Instructor in Bacteriology.
A. M. Woodman, Orchard Foreman.
W. P. Tufts, Instructor in Horticulture.
J. E. Cooter, Teaching Fellow in Agronomy.
R. A. Marshall, Teaching Fellow in Horticulture.
C. M. Scherer, Teaching Fellow in Plant Pathology.
F. L. Griffin, Associate Professor of Agricultural Education.
R. A. Dutcher, Instructor in Agricultural Chemistry.
J. H. Corsaut, Research Fellow in Plant Pathology.
J. W. Hyland, Teaching Fellow in Zoology.
A. F. Barss, Research Fellow in Horticulture.
G. B. Posey, Teaching Fellow in Plant Pathology.
R. F. Beard, Research Assistant in Agricultural Chemistry.
C. S. Brewster, Research Assistant in Poultry Husbandry.
G. H. Godfrey, Research Assistant in Plant Pathology.
J. R. Magness, Research Fellow in Horticulture.
F. L. Robinson, Foreman Stock Farm.
G. F. Moznette, Research Assistant in Entomology.
C. V. Ruzek, Assistant Professor of Soils.
C. E. Schuster, Teaching Fellow in Horticulture.
G. L. Philp, Research Fellow in Horticulture.
M. P. Henderson, Pathologist Southern Oregon Branch Exp. Station.
H. A. Lindgren, Superintendent Branch Exp. Station Clatsop County.
H. M. Carnes, Research Assistant in Agronomy (In cooperation with U. S. Department of Agriculture).
S. H. Hammond, Instructor in Botany.
J. R. Winston, Pathologist, Hood River Branch Experiment Station.
I. E. Fields, Foreman Sherman County Dry Farming Branch Exp. Station.
Obil Shattuck, Assistant in Harney Valley Branch Exp. Station.
Andrew C. McCormick, Assistant in Southern Oregon Exp. Station.
C. C. Starring, Research Fellow in Horticulture.
Harry A. Schoth, Teaching Fellow in Agronomy.
G. K. Van Gundia, Teaching Fellow in Botany.

Increased Facilities. In previous reports I have felt compelled to refer to the entirely inadequate facilities for instructional work in Animal Husbandry and Poultry Husbandry. It is therefore exceedingly gratifying to report that facilities have been materially increased during the biennium. One of the chief aims of the Dean and Director, and one which has received every possible encouragement and assistance from the President, has been to provide for these departments, and the department of Dairy Husbandry, such equipment and assistance as might be necessary to enable them to do really efficient work.

In the prosecution of this ideal, a beef-cattle and sheep barn has been erected for the department of Animal Husbandry. This barn is located just west of the old barns and has a floor space of 52 x 120 feet for sheltering stock. The hay loft has a storage capacity for 300 tons of hay and straw. Adjoining the barn are several concrete-floored exercise lots. Especial conveniences are provided for the feeding, watering, weighing, and handling of live stock. The west half of the barn is at present devoted to beef cattle and the east half to sheep, although it has been planned that the entire barn be eventually used for beef cattle.

Several buildings especially planned for the department of Poultry Husbandry have also been erected. The main poultry buliding is a three-story structure and is used principally for class, laboratory, and demonstration purposes. It contains a demonstrating room with des's and other necessary equipment; a shop with the necessary tools, benches and equipment for practice work in building poultry-plant equipment; storage rooms, office, and wash rooms are also provided. In the basement, rooms are provided for fattening and killing fowls, an incubator room for student use, and a feed room with the necessary machinery for grinding and mixing poultry feeds. Besides the main poultry building, there is an incubator house, with a capacity for twenty-four incubators and complementary apparatus; and a feed storage building and a brooding house. There are also colony houses for laying and breeding stock and for growing chicks. The colony houses, which are movable, are constructed upon a plan that could be adopted by any farmer. The colony breeding coops are also portable, and are used for investigations in both natural and artificial hatching.

The herds and flocks of the department of Animal Husbandry have been greatly improved in quality, representatives of several breeds not before included have been added, and the total number of animals has been fully doubled.

The dairy herd has been much improved by the purchase of several superb animals of each of the four leading dairy breeds. The creamery, also, has been remodelled and its equipment and capacity increased.

Altogether, it is believed that the facilities now provided for the work of these three departments, as well as the work that is actually being done by them, are fully equal to those of other departments of the School of Agriculture and are rarely excelled elsewhere.

NEEDS OF THE SCHOOL OF AGRICULTURE.

Department of Farm Management. The work of the various departments of the School of Agriculture has been progressing, as has been indicated, in a very satisfactory manner. Through the research activities of the Experiment Station, many problems are being studied and much information has been accumulated which is of interest and value to the farmers of the State. Each of these departments is interested in a special subject, or group of subjects, and most of the results already obtained relate to more or less isolated problems of production. The production of large crops and of superior live stock, while fundamental, is, however, only one phase of good farming.

That the agriculture of the State may be placed upon a permanently successful basis it is essential that the large crops and superior animals be produced economically and disposed of to the best advantage. In other words, not some, but all, of the factors of production and of marketing as applied to the problems of the individual farmer, must be investigated and the results so correlated as to indicate the most economical and profitable systems of farm management. In view of the exceedingly great importance of this work, and the constantly increasing demands for it, I respectfully recommend that a department of Farm Management be organized within the School of Agriculture at the earliest date practicable.

Additional Land. In special reports I have called attention to the urgent need for more land in connection with our instructional work in Agriculture. The College owns 340 acres, but after the campus, orchard, experimental plots, Poultry Plant, and the grounds surrounding the farm buildings are withdrawn, we have left for general farm operations less than 100 acres. This is entirely inadequate to provide pasture and forage requirements for the herds and flocks of the Dairy and Animal Husbandry departments; or to provide the necessary land for the crop production work of the department of Agronomy. To meet these necessary requirements, we are at present renting approximately 320 acres from various owners, much of which is inconveniently located, and, consequently, expensive to operate.

Due consideration should also be given, in this connection, to the fact that our herds and flocks should be materially increased. The dairy barn, when devoted entirely to dairy purposes, is capable of accommodating sixty cows and an equal number of young stock; and to give the rapidly increasing number of Agricultural students the facilities they should have for practical work in dairy husbandry, the dairy herd should be increased as rapidly as possible to the limit of the present barn capacity, or, at least, until we have good representative herds of the four leading dairy breeds. These enlarged herds will require additional land.

If the work in Animal Husbandry, moreover, is to develop to a point commensurate with the importance of the industry and the number of students interested, its flocks and herds should also be increased until they contain equally representative herds of the leading breeds of beef cattle, sheep, swine, and horses. To provide the necessary pasture and forage requirements for these herds and flocks, and also requisite land for the necessary grain-production work of the department of Agronomy, provision should be made for purchasing not less than 350 to 400 acres.

Buildings. Of the needed buildings mentioned in my last Biennial Report, only the Stock Barn and the Poultry Building have been completed. Increased instructional requirements, the steady growth of our equipment of live stock, and the consequent necessity of enlarging our farm operations make necessary the early erection of a number of additional farm buildings.

The present facilities for both the experimental and instructional work with swine are entirely inadequate, unsightly, and unsanitary. Plans have been prepared for a model hog barn which will provide adequate and satisfactory accommodations for the work, and which can be erected for approximately $4,500.

The only feasible plan for handling the manure from all of the College barns, if offense to the surrounding property owners and to the occupants of the dormitories is to be avoided, is to build a permanent manure yard located well back of the Farm, some distance from all residence property and all College buildings. Such a structure, adequate for storing the manure from all of the barns, will cost approximately $500.

A Veterinary Building should be provided as soon as possible. Satisfactory work in this important subject can not be given until adequate provision is made for more clinics. This building should include an anatomical and post-mortem laboratory, where dissection and post-mortem work can be given; a clinical and operating room, where all classes of clinical and surgical work can be demonstrated; stables for the isolation of contagious cases, etc. The character of the work precludes the use of other buildings for veterinary purposes, thus making it necessary to provide a special building. This can be erected at an estimated cost of $8,000 to $10,000.

The need of a Seed and Feed-Storage Building was fully described in my last report, and should be again emphasized. The present seed room in the barn was put in with the expectation that this space, which will soon be needed to accommodate our increased dairy herd, could be used only temporarily. It is entirely inadequate for the purpose, and the lack of proper accommodations for storing seed has resulted not only in much inconvenience but considerable loss.

While a wooden structure could be erected that would be adequate for seed-storage purposes for about $3,000, this would not be the most desirable type of building, and would not give accommodations for the storage and handling of large amounts of feed.

A cement building has been planned, which will serve for the storage of seeds and for large quantities of feed. The building, a two-story structure, will be a model of its kind. The floors, walls, and bin partitions are to be of cement. On the first floor, the main room will be used as a threshing, cleaning, weighing, and shipping room, equipped with a motor-driven separator, headrow thresher, fanning mill, grain grader, scales, etc. Surrounding this room are large cement storage bins for seed that is to be marketed, shelves with galvanized iron containers for selected seed for Station plantings, fumigation room for treatment of seed for diseases and pests, and large kiln for drying seed corn. Underneath the first floor will be a basement room with bins for storage of selected potato seed, roots, etc. On the second floor will be curing and storage room for grain in the straw, forage-crop samples, and exhibits, etc., large-capacity rack room for storage of the corn from the kiln; seed breeding room where the winter's work with the head and plant selections will be done and the same stored. At one end of the building will be cement feed-storage tanks, two stories in height and divided vertically into five or six cells of the estimated required capacity for the different kinds of feed used for the different departments. These feed storage tanks will have sufficient capacity to permit buying in carload lots or rom the field at harvest time. In connection with this feed storage will be a motor-driven grinder, dump platform for unloading wagons, and motor-driven cup elevator for elevating the grain into the tanks. Outside the building will be a driveway and scales, so that the wagons taking away grain can be loaded by gravity. The structure will be fire- and mouse-proof. The estimated cost is $20,000.

Much interest is now developing over the Pacific Northwest in the question of horticultural by-products. The Horticultural division reports that a heavy correspondence relating to this phase of horticulture is being received, and that some students are already pursuing work along this line. Many industries succeed in proportion to the profit which may be realized from their respective by-products, and I feel that this institution could be of great service to the horticultural interests of the State were we to make provision for research work and courses of instruction relating to the various horticultural by-products. The utilization of culls and other waste products will become more and more important with the development of the industry. If this research and instructional work is to be undertaken, a by-products building of considerable size, but not necessarily expensive, will be required. Fifteen thousand dollars would probably suffice to provide both building and equipment. There is no doubt that the great value of the work to the fruit industry of the State would abundantly justify the expenditure.

The rapid development of our dairy herd will soon make it necessary to devote the Dairy Barn exclusively to dairy purposes. The necessity of making other provision for the horses now accommodated there and the purchase of additional horses which will be needed to conduct our farm operations will make it imperative that a horse barn be erected in the near future. No plans for this structure have as yet been prepared, but a rough estimate would place the cost of a suitable structure at $15,000.

In my last report I emphasized the need of better greenhouse facilities for the departments of Horticulture, Agronomy, Botany, and Entomology. The development of the work of these departments results in this need becoming more and more urgent. Plans have been prepared for a modern plant to replace the old one and to cost approximately $35,000. If this cannot all be provided at the present time, I would respectfully urge that one section be erected for the department of Agronomy, at an epproximate cost of $3,500. For both the instructional and the experimental work in Soil Fertility, Soil Physics, Cereal Crops, Agrostology, Crop Breeding, Irrigation Farming, Dry Farming, etc., a greenhouse is indispensable for the best work. This is especially true of the work in Soil Fertility.

A suitable building for the storage of farm machinery is also needed,—this to replace the old barn, which is used at present for the storage of a portion of the machinery used on the College Farm. The room provided by this building is inadequate and decidedly inconvenient. With the necessary increase in farming land, there will be no possibility of this old structure accommodating the increased machinery equipment. Further, the present Farm Mechanics Laboratory Building does not have adequate room for sheltering the number of large tractors required for instructional work. Unless it is possible to make an addition at the rear end of the present Farm Mechanics Building to care for the tractors, it would seem that the only solution would be to accommodate them in a new machinery building, which could be so planned as to provide room for the farm machinery used by all of the different departments. Such a building, two stories in height, of good design, and constructed of brick and cement, would cost, it is estimated, $10,000.

There is also need of an Agricultural Auditorium Building, which would cost probably $30,000 to $40,000. For a discussion of the needs of this Building, see my last Biennial Report.

Salaries. Attention should be called to the fact that the salaries received by members of our faculty are generally less than those paid for similar service by other like institutions. During the past year several members of our staff have received offers from other institutions at salaries considerably in excess of what they were receiving here; and while we have been able to retain the services of most of these men, they have remained only because of interest in their work here and at considerable personal sacrifice. Since the value, to the State, of the faculty as a whole, increases considerably each year, by reason of increased experience and knowledge of local conditions, I feel that such provision should be made for salary increases as may serve to retain the members of the faculty in the service of the College and of the State.

THE EXPERIMENT STATION.

After nearly sixteen years of most efficient service as Director of the Oregon Agricultural College Experiment Station, Dr. James Withycombe tendered his resignation to the Board of Regents with the request that it become effective March 31, 1914. On April 8, 1914, the writer, who had served as Dean of the School of Agriculture during the past six years, was promoted to the position of Dean of the School of Agriculture and Director of the Agricultural Experiment Station. By mutual agreement between Dr. Withycombe and his successor, it was arranged that his final report, which has already been filed, should cover the work of the Experiment Station to June 30, 1914. It seems necessary in this report, therefore, only briefly to refer to certain minor changes which have been made in the organization of the work.

The principal changes mentioned above may be summarized as follows:

1. The correspondence of the School of Agriculture has grown during recent years to become a burden upon many of the departments, and more or less complaint has been received regarding the inadequacy of the service. In an attempt to relieve the various departments of as much of the routine correspondence as possible, a central stenographic office has been organized which receives all of the mail not addressed specifically to individuals, indexes it, answers as much of the routine correspondence as possible, and refers the remainder directly to the proper persons for reply. The office also has charge of all outgoing mail and the mailing of all publications, both of the Experiment Station and of the Extension Service, and does all manifolding for the School of Agriculture and the Experiment Station. As fast as possible, circular letters are being prepared for use in answering more completely than could well be done by individual correspondence, most of the more common requests for information. To facilitate the work, dictating machines, an electrically operated multigraph, a mimeograph, and an addressograph have been installed in the central office, and dictating machines in all of the departments. This central office, known as the College Exchange, has been in operation since August 1, and is giving the best of satisfaction.

2. A committee has been appointed for the purpose of drafting articles of agreement which shall, so far as possible, define the relations between the various departments. This committee has completed its labors and has submitted a report, which, however, has not as yet been finally considered and approved.

3. Recognizing the fact that many experiments become increasingly valuable the longer they are continued, and that usually no experiment should be abandoned without careful consideration, it has been thought best to make only slight changes in the experimental work which had already been inaugurated. It was thought, however, that greater definiteness and stability to the work would result if each project under investigation was more fully outlined and a copy of the outline filed in this office. In conformity with this plan, outlines for approximately eighty projects have been filed and approved.

Publications. Since April 8, the following bulletins and reports have been issued by the Experiment Station:

Bulletin 119, "A Report on the Experimental and Demonstration Work of the Substation Farms at Moro, Burns, Redmond, and Metolius." pp. 188.

Bulletin 120, "Improving Sandy Soils by the Use of Green Manure Crops." pp. 14.

Bulletin 121, "The Common Red Spider, or Spider Mite." pp. 97.

Bulletin 122, "Irrigation and Soil-Moisture Investigations in Western Oregon." pp. 110.

Bulletin 123, "An Inquiry into the Nature of a Somatic Segregation of Characters in the Le Conte Pear." pp. 18.

Second Biennial Crop Pest and Horticultural Report.

Four other bulletins are ready for publication; and in addition I am submitting for publication herewith a brief report from each of the various branch experiment stations.

Respectfully submitted,
A. B. CORDLEY,
Dean and Director.

REPORT OF THE AGRICULTURAL EXPERIMENT STATION.

To the President of the College,

Sir: I have the honor to submit herewith the biennial report of the Oregon Experiment Station for the years 1912-13 and 1913-14 inclusive.

The work of the Station during the biennium has made good progress, and in some departments phenomenal results have been achieved.

Brief Review of Growth and Services of the Station.

Since this report concludes my services as Director of the Experiment Station, I beg your indulgence for this deviation in presenting a brief review of the progress of the Station, and the development of agriculture throughout the State during the past sixteen years, concurrent with my administration as Director of the Experiment Station.

In 1898 there were ten members of the Station Staff; at this date there are forty-five. In 1898 there was the home Station with its five departments; now there are in addition to the home Station seven branch stations and some twelve cooperative experimental plats, with nine departments.

The total value of the agricultural products of the State in 1898 was less than thirty million dollars, while the total value of these products in 1913 was $139,505,328.

Dairying, during the past sixteen years, has shown a phenomenal growth in production, having increased in value from less than three million dollars to $18,425,000. Poultry has also shown a large increase in production; and the production of clover seed has grown from practically nothing to a crop valued at two million dollars.

Perhaps the most notable value of the Experiment Station work has been its influence for better agricultural and horticultural practices throughout the State, including its influence for better methods of handling live stock, especially the growing and fattening of swine.

The demonstration work of the Station, showing improved methods of moisture conservation, has been worth millions of dollars to the farmers in the drier sections of the State. These demonstrations, in fact, have shown that lean years may be largely averted in dry-farm districts.

The Experiment Station, in short, has pointed the way for a more successful agriculture, and has endeavored at all times to meet, to the best of its ability, every demand made upon it by this great and growing industry.

Report for Biennium 1912-14.

No changes in staff of any moment have occurred during the biennium.

In the spring of 1913 the Hood River Branch Experiment Station was organized, with Messrs. J. R. Winston, plant pathologist, C. C. Starring, horticulturist, and A. L. Lovett, entomologist. The work of this station has made excellent progress, and good results to the horticultural interests of the district have been achieved. Much preliminary work for the establishment of the Clatsop County branch experiment station has been accomplished; but it is as yet unorganized on account of the lack of proper building facilities.* The investigative work of this station will be along the lines of dairying, small fruits, and vegetable gardening, these being the principal agricultural industries to which the district seems to be especially adapted.

During the biennium the Station was able to cope with practically all of the important problems for which a pressing need for a more or less immediate solution was felt. It is thought, however, that further investigative work should be undertaken, at the earliest practicable opportunity, with control methods for fire blight. The Southern Oregon branch experiment station has undertaken a very extensive variety test with American and European pears with the hope of finding varieties of commercial value which are immune to this scourage, or with the hope of at least securing a vigorous, immune stock. In cooperation with this work a well-equipped laboratory should be maintained and placed in charge of a thoroughly trained scientist for conducting pathological experimental investigations.

One of the most pressing needs of the Station at this time is a fund for Station publications. There is a great deal of valuable accumulated experimental data that should be in the hands of the farmers, but the funds of the Station available for such purposes are not adequate to publish this information.

The acquirement of the 115 acres of additional land is proving very helpful to the work of the Station. This land is devoted mainly to livestock husbandry, principally to the experimental feeding of sheep and swine. Twenty acres is utilized as an experimental orchard, and twenty acres as a poultry breeding farm for egg production.

Facilities for Station work have been materially improved during the biennium. The remodeling of Science Hall has greatly increased the laboratory efficiency of the chemical department, and much-needed laboratory equipment has been acquired by other departments.

The following is submitted as a synopsis of departmental reports relating to the principal problems under investigation. Many facts in relation to this work have been published in the Biennial Crop Pest and Horticultural Report for the years 1911-12.

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*For information concerning the progress of work at the Clatsop County branch experiment station, since this report was written, consult the Report of The John Jacob Astor Branch Experiment Station, Dec. 1914.

DIVISION OF HORTICULTURE.

ADAMS INVESTIGATIONS.

Project No. 1. Pollination. During the biennium a research bulletin, The Gross Morphology of the Apple, was issued, giving investigative data of work under the pollination project. A digest of this bulletin, which is one of a series of three on the Pollination of Pomaceous Fruits, may be briefly given, for the untechnical reader, as follows:

The major part of the edible portion of an apple or pear is of the same nature as is the tissue composing the stem. It may be considered as a hollowed-out stem which bears within it small fruits much resembling plums in structure. These findings, as set forth in the bulletin, are of interest and importance because they show that those conditions which modify stem structures, and only those, can modify the edible portion of the fruit, and that the latter is not changed directly by the influences of one or another kind of pollen.

Fruit-bud formation, especially with the Yellow Newtown apple, is being studied as a phase of the pollination problem. A complete study of the bud is being made from the time it begins to assume form up to the development of the fruit. The study is essential since there may arise and exist among the blooms on a tree abnormalities which would render them incapable of developing into fruit even though ideal conditions for pollination existed. It is estimated that eighty per cent of the work of this phase of the problem is completed. Comparisons of the developing buds in different positions on the tree indicate that differentiation into fruit or leaf buds takes place at different times. This confirms the conclusions of Goff. The investigation has shown that there is greater uniformity in this regard among the buds on spurs which have already borne fruit than there is among buds that are forming on young wood that has not borne fruit.

The study of the fibro-vascular system of the apple has been completed, and while other investigators, notably McAlpine of Australia, have contributed information on this subject, no record reveals the thoroughness and completeness of detail shown in the study made by this Station. Excellent progress has been made in the histological and cytological investigations on the pollen and ovules of the apple and pear.

Project No. 2. Irrigation Work with Apples. Conditions were unfavorable for this work during the summer of 1912, owing to an unusual amount of rain. A series of investigations in greenhouses, however, were undertaken, which are closely allied to the irrigation problem. Various amounts of water have been applied to potted dwarf pear trees, and a study of the effects not only on the external characters of the tree as to its growth, color, etc., was made, but a complete tissue study as well. (Second Biennial Crop Pest and Horticultural Report.)

New Projects. Two new projects have been accepted under the Adams Act. The first is concerned with pruning and the title suggested is, "A Histological and Physiological Study of the Buds of Pomaceous Trees as Influenced by Pruning." A young orchard of 320 trees, with probably additional plantings, will be utilized for this investigation, and the Southern Oregon Station pruning blocks will be made available for supplemental data.

The second new problem is a study of "Critical Temperatures." Some important preliminary work has already been done, and with the dwarf trees, greenhouses, and cold-storage plant available for these studies, good results should be secured.

HATCH INVESTIGATIONS.

Most of the problems under this fund are supplemented with the Crop Pest Fund.

Problem No. 1. **Strawberry Variety Investigations.** Extensive experiments have been conducted for several years in the variety testing of strawberries. Altogether 196 varieties have been tested. Of these varieties eight may be said to have approached the ideal commercial standards established for this test. Two of these were the "Jucunda" and "Triomphe de Gand." These were among the early varieties introduced into Oregon and were grown for local use only. The other six varieties, namely, Wilson, Clark, Magoon, Marshall, Oregon, and Gold Dollar, are still being grown commercially. The Wilson, however, is gradually losing ground. This berry is of eastern origin. The Marshall, which commercially ranks fifth in the State, is of Massachusetts origin. The first two named are of European origin, and the Clark, Magoon, Oregon, and Gold Dollar originated in this State. These four for the past five years have given the best results at this Station. While many of the eastern varieties succeeded perhaps as well as in the East, they do not meet the commercial requirements of the West. It is possible that other eastern varieties may later be introduced that will prove superior to those tested. The Gold Dollar may be recommended as our most satisfactory early variety for the Oregon grower. It is soft in texture, however, and cannot be shipped to any considerable distance. The Magoon is the most popular main-season variety for the markets, but is a poor shipper and not desirable for canning. In some localities the Marshall takes the place of the Magoon. The Clark is the leading variety for shipping and canning, and the Wilson is an excellent canning variety for some of the stronger soils. The Oregon is a good variety for strictly local markets, having a very long fruiting season, and good quality, and is therefore valuable for the home garden. (Second Biennial Crop Pest and Horticultural Report.)

Problem No. 2. **Strawberry Breeding.** For several years this Station has been working on the strawberry breeding problem. From a large number of seedlings, two or three of great promise have been selected. One of these seems to have embodied the qualities of the Magoon and the Clark. It is too early yet, however, to draw conclusions. The mother plants are very promising.

A pedigree study of strawberries has been completed which will be a distinctive contribution to the knowledge of plant breeding.

Problem No. 3. **Loganberry Investigations.** a. Loganberry Fertilizers. Fertilizing experiments with loganberries have been continued during the past season, but results do not warrant conclusions at this time.

b. Loganberry Pruning Investigations. A commercial planting of loganberries has been made in the new orchard tract where an investigation of various systems of pruning and training may be made. There is a great demand for this information among the growers of this State.

Problem No. 4. **Cherry-Breeding Investigations.** A large number of cherry seeds of known parentage has been secured. These seeds have been preserved and are planted with the hope of securing a goodly number of promising seedlings. There is a large field for this work in the State, and the purpose of the work is to determine the value of certain cherries for breeding stock and to produce commercial cherries of merit for the Pacific Coast.

Problem No. 5. **Apple-Breeding Investigations.** During the past six years apple seeds have been secured from the pollination experiments. These seeds are of known parentage. Seedlings obtained from these seeds have been grafted upon dwarf trees and will soon begin to fruit. The purpose of this investigation is to ascertain the value of certain apples for breeding, with the hope that valuable commercial varieties may be obtained.

Problem No. 6. **Prune-Breeding Investigations.** Some progress has been made in prune breeding, and it is contemplated to take up the pollination of the prune similar to the work conducted with the cherry for the past three years. In this way useful data should be secured to aid in the origination of a superior prune to that which is at present grown.

Problem No. 7. **Cover-Crop Investigations.** For this work between 500 and 600 dwarf apple trees on Doucin stocks have been set. These trees will be utilized in a series of experiments relating to cover crops, tillage, mulches, etc.

Problem No. 8. **Nut Variety Tests.** A large collection of walnuts and other nuts have been planted in the new orchard, and these, with those growing in the home orchard, should supply valuable data as to the best commercial varieties.

TRIAL GARDENS.

In cooperation with the Bureau of Plant Industry, a trial garden has been established to test out from time to time new introductions.

VEGETABLE INVESTIGATIONS.

Investigations in vegetable gardening are conducted jointly under the Hatch and Crop Pest Funds.

1. **Greenhouse Tomato Investigations.** This is a continuation of the work undertaken in 1912. The object sought is, first, to determine the best forcing varieties of tomatoes adapted to local conditions of good market requirements; second, to determine the efficiency and economic

value of artificial pollination; third, to make a study of the blossom clusters as to variation of varieties and its relation to the economic production of fruit. Two greenhouses, 30′x20′, have been devoted to this work. Both English and American varieties were grown, and the fruit produced was of a very high commercial standard. Table I gives the total number ounces of fruit produced between May 20 and June 20 inclusive, one row each of four plants:

Table I. Fruit Produced (number of ounces) by different varieties of Greenhouse tomatoes, under different methods of pollination, between May 20 and June 20.

Variety	Pollinated by hand	Pollinated by jarring	Not Pollinated
Stone	223½	162½	72½
	243½	142½	48½
Comet	266	239	114½
	186½	182	101
Jewel	169	144	132
	296½	192	104½
B. Best	189	......	114
	346½	216½	......
A-1	152½	......	90½
A-E 3	132½	......	92½
Best of All	179	......	69
S. Earliana	325	280	....

2. **Onion Investigations.** Cooperative work with a number of growers has been undertaken to determine best cultural methods, use of fertilizers, and other factors relating to the industry.

3. **Vegetable Type Selection.** This is an investigation for the purpose of determining desirable types of vegetables for the canning industry. Seed will be secured of the most desirable types and distributed among commercial seed growers.

CROP PEST INVESTIGATIONS.

Problem No. 1. **Prune Fertilizer Investigations.** This is a cooperative experiment with two growers in Yamhill County and a large fertilizer firm. The purpose of the work is to secure data as to the influence of fertilizers on the trees, foliage, and fruit, and the effect upon the evaporating qualities of the fruit.

Problem No. 2. **Prune Standardization Investigations.** The purpose of this work is to effect a definite standard, or standards, for the commercially dried prune in the State. This will include a study of conditions influencing the fruit from the time it is grown until it reaches the consumer, including the technique of evaporation, sanitation, chemistry of the product, molds, insect infestation, processing, grading, and packing for market. The division of Horticulture will receive assistance in this investigation from the departments of Chemistry, Plant Pathology, and Entomology.

Problem No. 3. **Loganberry Investigations.** These investigations mainly relate to the commercial phases of the fruit, including the evaporated product and the juice.

a. Evaporation Investigations of the Loganberry. This work was done at Salem in the dryer of Mr. J. J. McDonald. An attempt has been made to ascertain if the dried loganberry can be standardized, first, by investigating the time and methods of harvesting the product; second, the possibility of grading it, either in the field or at the evaporator; third, length of time required for evaporation; and fourth, the relation of temperature and air circulation to the product obtained.

It was found that the hard, ripe berries have the best quality and weight; that under average conditions berries should not be picked after noon and preferably not after 10 a. m. There is a very close relation between the dried weight obtained and the general condition of the product on the one hand and the condition in which the berries are brought to the evaporator, on the other. Berries picked after 10 a. m. are apt to be soft, to melt down, caramel, and scorch more than those which are picked in the early morning. It was found that the length of time given for evaporation was too long—many growers using 30 to 40 hours. The best results were obtained by drying the berries 16 hours and second best by drying 13 hours. The general practice is to run the temperature too low at first, and this condition, coupled with lack of grading in many cases, causes a loss of 2 pounds to the crate, and also gives a large percentage of scorched fruit. It was found better to start the temperature at about 130 degrees and conclude with a temperature of 150 degrees.

b. Loganberry-Juice Investigations. This study was undertaken to determine the commercial value of this product. It was found that by crude methods 75 per cent of juice could be obtained. It was also found that there is a very close relation between the amount of juice obtained and the length of time the berries stand before being pressed. Many formulas were used; but for home use, one part of sugar to three parts of juice by weight is recommended, the juice to be heated to the boiling point and bottled immediately in sterilized bottles. For commercial purposes, ten pounds of sugar to one gallon of juice is the formula suggested. Very ripe berries put up at once give the best aroma and flavor; second best are the dead-ripe berries, which are allowed to remain for twenty-four hours; third best are the hard ripe berries, and the least desirable are the green berries. The ripe berries give the largest percentage of juice. Chemical analysis shows that dead-ripe berries run from 1.78 per cent to 1.88 per cent acidity, while the hard berries and those which are unripe give more than 2 per cent acid; that the ripe berries run from 6.4 per cent to 6.46 per cent in sugar content; that the hard, ripe berries run from 4.91 per cent and the decidedly under-ripe run only 3.5 per cent sugar.

Problem No. 4. **Fruit-Pit Investigations.** Work in this investigation for the past two years has been conducted at the Wallace orchard, Salem, and the Meeker orchard, Corvallis, and also in cooperation with the department of Plant Pathology, at the Hood River branch station. Various fertilizers and different cultural methods have been tried, and in the Meeker orchard toxic substances have been fed to the branches of trees. Results so far do not warrant conclusions.

DEPARTMENT OF BOTANY AND PLANT PATHOLOGY.

ADAMS INVESTIGATIONS.

Project No. 1. Cherry Gummosis. This work has been continued along the same lines as heretofore, since it has been necessary thoroughly to check up and confirm all previous work. A great deal of culture work has been done, as well as inoculation work. Similar troubles have been found upon other drupaceous hosts which are now being investigated, and several strains of the organism have been found. Survey work in certain orchards established the fact that the Lambert cherry suffers less from the disease than does the Bing or the Royal Ann varieties, which seem to differ but little in susceptibility. It was also proved that the Mazzard type of seedling is in general resistant to the disease. Limb grafting on this stock is recommended for the susceptible varieties. During the winter the strains of bacteria isolated the previous season were subjected to sufficient cultural study to indicate that the majority were similar to that isolated by Mr. Griffin—one strain capable of inducing gum-flow differed and was called "strain 2." Lack of incubator facilities resulted in the postponing of the critical work on the physiological and cultural characteristics of the bacteria. During the spring, inoculations and isolation work was done with the same results as in the previous year. From various sources new bacterial strains were isolated, most of them similar to **B. cerasus,** but a few like "strain 2." Late in the spring several apparently saprophytic strains were isolated from lesions, while still later all attempts to secure organisms from the advanced margins of cankers failed, even where the bacterial structures could be found in microscopic sections. This seems to indicate that the bacteria die during the summer in many, at least, of the cankers. In the case of the inoculations, the earliest ones progressed the farthest, but in all cases the spread seemed to be checked by cambial activity before cankers of any size were formed. Gum exudation took place.

Histological study of fresh material was most carefully carried on with specimens of diseased branches and trunks from many sources. Again and again the presence of bacteria was demonstrated in the lesions even in tissues beyond the advancing margin of the discoloration in rapidly spreading cankers, providing rather convincing support for the theory that the disease called "gummosis" is due to their presence. The bacteria seem to advance largely through the phloem tissues in the earlier part of the season, but later this advance seems to be checked by the starting of cambian activity and wound-cork formation in this region, though the lesion may still extend itself to some extent in the outer cortical region until there too wound-cork is formed which limits the season's growth.

Observations on the inoculations of 1912 indicate that no spreading of the lesions produced in that way took place during the past season. This was also true of many natural cankers under observation, though in some cases there appeared to have been a spreading from some of the old cankers. This seems to lead to the conclusion that the bacteria live over in but few of the cankers from one season to the next.

Cutting out of the diseased tissue found on certain trees early in the season seems to have resulted in a control of the advance of the disease on those trees during this season, accompanied by a rapid callus-formation. Many trees were observed, however, where infections not evident in 1912 have advanced during the succeeding spring at a very rapid pace, giving no external indication of the extent of the injury till new wood began to be formed around the dead area.

Project No. 2. Apple Tree Anthracnose. The work on this project has been largely a continuation of previous work. It seemed desirable to confirm all previous results obtained and to carry on a large series of inoculations. This work is in preparation at the present time. This disease has been found on the pear and some study of this made. The perfect stage was also found upon the pear. The disease, as it occurs upon quince, has received some attention. The study of a fruit rot and twig blight is in process. Recently a large series of cultures have been obtained, some from the perfect stage on both apples and Winter Nelis pear, and the conidial stage from apple branches, apple fruit, pear seedlings, Winter Nelis branches, quince fruit and the twigs. It is proposed to carry on a large series of inoculations on apple and pear to determine absolutely whether the forms are all the same.

HATCH INVESTIGATIONS.

Only a small allotment from the Hatch Fund has been available during the year by this department. This has been used entirely for salaries and has been considered as supplementary to Adams and Crop Pest work.

CROP PEST INVESTIGATIONS.

No. 1. Potato Diseases. Potato diseases have received special attention. Several diseases have been under observation, including certain diseases caused by species of Fusarium, the Silver Scurf,—a disease to date not reported in the west,—Rhizoctonia, scab, etc. The principal work has been on the late blight, which, in the fall of 1912, was very serious in the State and caused a great deal of damage. Important observations made on this disease, developed the fact that it also attacks tomatoes, producing rot of the fruit as well as a blight of the leaves.

During the season of 1913 spraying experiments for the control of the blight have been conducted at Clatskanie on the 16-acre field belonging to John Cheldelin. A similar experiment was also conducted by John Miller in an adjoining field of twenty-two acres. Bordeaux mixture was used. The first application was made July 11, the second, Aug. 7, and the third the later part of August. The 4-4-50 formula was used in the first two sprayings, and 6-6-50 in the last. The results of the spraying experiment were very conclusive, since the blight appeared in the fields early in September, and the plants which had not been sprayed were soon completely destroyed, while those which were sprayed were still alive and vigorous. Many potatoes were found rotting in the ground at picking time on the unsprayed plots, but such tubers were very rare where spraying had been conducted.

No. 2. Brown Rot of Prunes. Spraying experiments were conducted in the orchard by Mr. Z. L. Chamberlain at Newberg. The crop was very light in this orchard and very little brown rot developed, so the results of the experiment were inconclusive, but indicated the benefit of spraying.

No. 3. Mushroom Root Rot. Considerable field work on this disease was conducted. The disease was found upon the apple, cherry, peach, prune, rose, oak, walnut, etc. Pure cultures were obtained from many of these hosts. Some study was also started on cultures originating from mushrooms on fir, maple, etc., to determine whether the fungus which attacks the fruit trees is the same as that which occurs native upon forest trees. Some inoculation work has also been done. Observations on combative measures show that the recovery from attacks of this disease have been made in well-authenticated instances by surgical methods on apple trees accompanied by the exposure of the base of the trunk and main roots.

No. 4. Rust of Pear and Quince. A rust of pear has occasionally been reported from Oregon for a number of years past, though it is usually not considered serious. This was reported for the first time on quince in the summer of 1912. In this instance nearly 50 per cent of certain trees were affected. In the spring of 1913 this disease broke out in epidemic form and caused a great deal of damage to pear and quince trees. It very rarely occurs upon the apple. Studies of this disease seem to indicate that it is probably the same as the one which occurs upon native pomaceous hosts, notably service berry and hawthorn. It has been shown that the rust which occurs upon the native hosts is connected with a rust which occurs upon cedar. No proof has as yet been found that the pear and quince are genetically connected with cedar rust, but it is thought that this is true.

No. 5. Crown Gall. Experiments have been conducted during the past biennium on crown gall of peaches at Ashland. This work has been an attempt to control crown gall after it gets a start in an orchard. While it is too early to obtain final results, indications are that the work was more or less successful. An extensive experiment is being conducted in cooperation with the Oregon Nursery Company at Orenco. This consists in comparisons of the growth of trees which are affected with crown gall and hairy root at planting time with others which are healthy.

DEPARTMENT OF ENTOMOLOGY.

ADAMS INVESTIGATIONS.

Project No. 1. Scolytidae infesting the Douglas Fir. Pseudotsuga taxifolia (Pow) Britt. The following general phases of the work have taken up most of the time allotted to this work:

1. Present status of this or related problems—a review of all the literature thereon.
2. A systematic study of the group. The accumulation of a collection.
3. A study of forestry and lumbering methods, and their possible bearing on the problem.
4. The number of species concerned. Their distribution in Oregon.
5. Effect upon the tree; part attacked, symptoms of attack.
6. Life-history and biology.

Project No. 2. Red Spider Investigations. Work in color variations completed. Systematic work pursued. Value of the characters of the genital armature discovered and used. Four new species, all of economic importance, found. Three described. Key to males published. Slides from Washington examined and notes and drawings made. Work on natural enemies continued. Several new natural enemies found, including a gamasid mite, a Bdellid, a species of Rhyncholophus. Notes and drawings made of previously known natural enemies. Some of the stages in the life-histories of natural enemies determined. Geographical distribution work started. Map of United States made for showing distribution of each species. Drawings made of several species of red spiders. Notes on seasonal history continued, also those on habits. Control measures tried as follows: Fumigation, evaporation of sulfur, spraying with several kinds of sprays against spiders on hops, pears, violets, tomatoes, and melons, and some other plants. Cause of infestation and methods of its prevention studied. Nature of injury studied. Samples obtained, photographed, and mounted. (Station Bulletin 121.)

HATCH INVESTIGATIONS.

No. 1. Introduction of Beneficial Insects into Oregon. Interesting data of more or less value have been secured in connection with the Coccinellidae (Ladybird beetles). Notes on migration and hibernation were made and the life-histories of two different species have been worked out. Statistics have been takn on the abundance of different species, as well as upon the different insects that serve as hosts of these enemies. **Megilla maculata** (the common eastern Ladybird beetle), a very abundant species in the East, has been introduced and is being reared in confinement. Specimens will be liberated when they become acclimated. A study of some new enemies of stored grain has been made, Recently a shipment of codling moth parasites (**Calliephialtes messor** Graves) from California has been received, and an effort will be made to establish this insect in Oregon.

CROP PEST INVESTIGATIONS.

The Shot Hole Borer (Xyleborus dispar Fab), **Brown Apple Aphis (Aphis sorbi** Kal) and the **Strawberry Root Weevil (Otiorhynchus ovatus** Linn.) were selected for primary investigations. In addition to these, as time and circumstances would permit, a number of less important insects have been studied. The results of the investigations, supplemented by other data previously in the department files, have been published in the Biennial Crop Pest and Horticultural Report for 1911-12.

A number of minor problems studied during the past two years are now being studied as major p[illegible]s, and it is the intention of the department to take the following problems and work them out one by one:

1. The introduction of beneficial insects into Oregon.
2. Combination sprays: To determine practicability of combining lime-sulfur with arsenate of lead, arsenite of zinc, and "Black Leaf-40" for control of insect pests and plant diseases, in cooperation with the department of Plant Pathology.
3. Life-history and control methods of the Woolly Apple Aphis (**Eriosoma lanigera**).
4. Life-history and control methods of the Fruit Tree Leaf Beetle (**Synota** Albida).
5. Life-history and control methods of the Bud Moth (**Tmetocera ocellana**).
6. Life-history and control methods of the Cherry Fruit Fly (**Rhagoletis cingulata**).
7. Vetch and Pea Aphis (**Macrosiphum pisi**).
8. Continuation of studies on the control of the Strawberry Root Weevil (**Otiorhynchus ovatus**).
9. Life-history and control (preliminary) of Strawberry Root Miner (**Aristotellia sp.**)
10. Continuation of studies of poison sprays for the control of the Currant Fruit Fly (**Epochra canadensis**).
11. Life-history studies and control measures of the Cucumber Beetle (**Diabrotica soror.**)
12. Studies in the life-history and control of the Clover and Alfalfa insects.

Insecticide and Fungicide Investigations. In cooperation with the department of Botany and Plant Pathology.

The following are the summarized notes of results of this investigation:

1. Lime-sulfur 29.5 degrees Be (1-30) plus acid arsenate of lead, 2 pounds to 50 gallons, did not cause any more spray injury to foliage and fruit than did the lime-sulfur and neutral (spray injury quite bad on Newtown and Ben Davis). Injured fruit worst on south side of trees and in direct rays of sun.

2. Lime-sulfur 29.5 degrees Be (1-30) plus arsenite of zinc, 1 pound to 50 gallons, (two different brands) caused very little injury to foliage and except in the case of Ben Davis did not cause any more injury to

the fruit than was found on unsprayed trees. (Ben Davis suffered badly.) The injured fruit on these trees was worse on south side of tree.

3. Injured apples similar to those on the sprayed trees could occasionally be found on unsprayed trees in the check plots, but the difference in percentage was so great as to warrant the conclusion that the injury on the sprayed trees was in some way due to the action of the spray.

In 1912 a series of experiments was started upon the decomposition of combined sprays when allowed to stand. The materials in each case were kept in corked bottles and examined from time to time during the following year. Apparently no further change occurred and each combination retained its characteristic odor. An examination June 1, 1913, gave the same conditions, and tests for the insecticidal value showed them to be apparently as efficient as freshly prepared materials.

The arsenates of lead used in these experiments were especially prepared by the Station chemical department and were theoretically pure.

The fungicidal value of the following experiments was not considered.

To determine the effect upon apple foliage of the above chemicals alone and in combination, a series of experiments was conducted as follows: In a block of 20 Newtown apple trees, each tree was used for one spray. Applications made June 16, 1913.

Ex. No.			
1.	Arsenate of lead (acid)	8 lb. to 100 gals.	water
2.	“ “ “ “	4 “ “ “ “	“
3.	“ “ “ “	2 “ “ “ “	“
4.	“ “ “ (non-acid)	8 “ “ “ “	“
5.	“ “ “ “	4 “ “ “ “	“
6.	“ “ “ “	2 “ “ “ “	“
7.	Arsenate of zinc	8 “ “ “ “	“
8.	“ “ “	4 “ “ “ “	“
9.	“ “ “	2 “ “ “ “	“
10.	Arsenate of lead (acid)	8 “ “ “ “	lime-sulfur 1-30
11.	“ “ “ “	4 “ “ “ “	“ “ “
12.	“ “ “ “	2 “ “ “ “	“ “ “
13.	“ “ “ (non-acid)	8 “ “ “ “	“ “ “
14.	“ “ “ “	4 “ “ “ “	“ “ “
15.	“ “ “ “	2 “ “ “ “	“ “ “
16.	Arsenate of zinc	8 “ “ “ “	“ “ “
17.	“ “ “	4 “ “ “ “	“ “ “
18.	“ “ “	2 “ “ “ “	“ “ “
19.	Water without chemicals		
20.	Lime-sulfur, 30.5 degrees Be. 1-30		

These trees had not been previously sprayed, and the leaves were more or less affected with scab. The orchard had only been cultivated once and therefore was in prime condition to give results in an experiment of this character. The two days following varied from rain to sunshine, mostly rain.

Summary of Results.

Lime-sulfur plus arsenite of zinc; lime sulfur plus arenate of lead (acid); and lime-sulfur plus arsenate of lead (non-acid); in all strengths caused serious burning. If anything, the non-acid injury was slightly the worst. Lime-sulfur caused considerable injury, but not one-half as much as in the combination sprays.

Arsenite of zinc alone and in all strengths caused considerable burning. The burning was different, however, from that of the combination and lime-sulfur sprayed trees. With the combination sprays, the entire leaf was destroyed or else the injury covered a distinct portion, all parts of which were discolored. Scab spots on the leaves appeared black, ordinary leaf tissue brown.

With the arsenite of zinc, only the scab spots were injured. In a few cases entire leaves were blackened or browned. The majority of the injured leaves were spotted with injury. Each one of these spots was determined to be the seat of germination of a scab spore. The leaf tissue, between and surrounding these spots, did not appear to be injured.

Arsenate of lead (acid) and arsenate of lead (non-acid) did not cause injury in any case when used alone. In experiments with arsenite of zinc, etc., where injury did occur, the injury did not begin to show up badly for about five days, when suddenly, over night, it appeared at its worst. The check trees, sprayed with water, did not show injury.

As soon as the injury on trees sprayed with arsenate of lead (non-acid) became apparent, checks were made on trees 10, 12, 13, 15, 16, and 18. The utmost care was used in these applications, and as the same injury occurred a second time, we must conclude that even with the purest of chemicals, lime-sulfur plus arsenate of lead is not a stable spray under northwest conditions.

The controlling factors are yet to be determined. Two other experiments for the control of the codling moth have not yet been finished. But in one of these, lime-sulfur plus arsenates of lead (acid and non-acid), and arsenite of zinc, did not cause more than slight injury at the first application. The second application on June 30 caused serious injury. Therefore we may say that the above combination sprays are safe for the calyx spray, but are unsafe at the time of the second codling moth spray.

Recent Insecticide Investigations.

1. To find the value of lime-sulfur as a stomach poison.
2. To find the value of arsenate of lead (acid) as a stomach poison.
3. To find the value of arsenate of lead (non-acid) as a stomach poison.
4. To find the value of arsenite of zinc as a stomach poison.
5. To find the value of arsenate of lead (acid) plus lime-sulfur as a stomach poison.
6. To find the value of arsenate of lead (non-acid) plus lime-sulfur as a stomach poison.
7. To find the value of arsenite of lead as a stomach poison.

The chemicals used were secured from the same source as those used in the spray-injury experiments.

Larvae of the tent caterpillars, **Lalacasoma erosa** and **Malacasoma pluvialis,** were used in these experiments and were placed on sprayed twigs in the open part of the insectary. Newspapers were placed under each of the twigs to catch the dead larvae and every experiment kept separate from the rest.

Summary of Results.

Arsenite of zinc is a quicker-acting poison than arsenate of lead, acid or non-acid, and remains in suspension much better. Acid arsenate of lead is a quicker-acting poison than the non-acid and remains in suspension better. Non-acid arsenate of lead is slow in its action, but is satisfactory in that death finally occurs.

Lime-sulfur in the experiments conducted has not proved to have much value as a stomach poison. Lime-sulfur with arsenicals seems to retard to a more or less extent the action of the poison and it is possible for larvae to feed on foliage sprayed with weak strengths of lime-sulfur plus arsenate of lead and recover, if transferred to fresh foliage within a few days.

Very young caterpillars placed on twigs freshly sprayed with lime-sulfur 1-30 died within two or three days, but as they did not feed, death must have resulted from the gases given off. Very young caterpillars placed on twigs that had been sprayed with lime-sulfur 1-30 and allowed to stand, refused to eat and finally died from starvation. Half-grown larvae placed on twigs sprayed with lime-sulfur did not feed as did the larvae on unsprayed twigs, but did eat to some extent. After two weeks on lime-sulfur sprayed twigs, they were transferred to freshly sprayed leaves and finally matured, pupated, and emerged in the adult stage.

Lime-sulfur probably acts as a repellent to biting insects in the same way that Bordeaux does against the potato flea beetles. Lime sprinkled or sprayed on the foliage in the same proportions as found in a certain amount of lime-sulfur has no effect.

DEPARTMENT OF CHEMISTRY.

ADAMS INVESTIGATIONS.

Hop Investigations. A study was made of the chemical changes in the hop due to "sulfuring" (the common treatment with sulfur dioxide fumes). The results obtained from the investigations showed:

1. That there is nothing to indicate that sulfuring in the bleaching process affects the bitter resins. The resin of the "sulfured" hop contains no sulfur.
2. That the sulfur dioxide does not combine with the essential oil of the hop.
3. That the "unsulfured" hop contains sulfur in the sulphate form but no sulfur which is volatile by the ordinary steam distillation.
4. That different samples of "sulfured" hops contain different amounts of sulfur, both total and volatile with steam. There seems to be no definite proportion between the volatile sulfur and the total sulfur.
5. That the amount of sulfur present in the unsulfured Oregon hop is practically constant.
6. That the analytical methods which have been in use for the estimation of the amount of 'sulfuring" are unreliable.

7. Methods for determining quantitatively the different forms in which sulfur is found in the "sulfured" hop have been worked out.

The hop seed when ground yields an ether extract amounting to approximately 25 per cent of its weight. This extract contains a drying oil which resembles linseed oil in some of its properties.

An experiment designed to show the chemical changes taking place in the hop during storage has been carried on since October 31, 1912. Samples have been taken every two months until the present time. All the samples taken have been analyzed. The results as yet are incomplete.

Chemical Spray Investigations. The work on this project during the biennium has been a study of the different arsenates of lead. The most significant results of the work completed thus far are as follows:

1. Lead hydrogen arsenate (lead "acid" arsenate) has been prepared in the pure form. The work done indicates that this compound has not been successfully prepared in its pure state previous to this time.
2. All attempts to prepare ortho arsenate (neutral lead arsenate) have failed. In fact, the work shows that this compound, which has been thought by previous investigators to be one of the constituents of commercial lead arsenate, does not occur in this material.
3. A new arsenate of lead has been prepared. This is a basic arsenate which evidently is the principal constituent of the commercial "neutral" arsenate of lead.
4. A pure pyro arsenate of lead has been prepared.
5. An analytical method for determining the amount of lead hydrogen arsenate (lead "acid" arsenate) in mixtures of this compound with the basic lead arsenate, has been developed. This method is a decided step toward the accurate valuation of commercial samples.
6. In cooperation with the department of Entomology, experiments have been carried out on the actual insecticidal value of the different lead arsenates. The results obtained show that lead hydrogen arsenate has much greater killing powers than the basic arsenate.

Soil Bacteriological Investigations. This work has been carried on cooperatively with the department of Bacteriology. Nearly 500 chemical determinations have been made in this work. Six distinct types of Oregon soil have been studied. The work thus far has been a comparative study of the ammonifying, nitrifying, and denitrifying efficiency of the different types and the effect of the application of lime upon these powers.

Lime seems to have a marked effect upon the soils of Western Oregon, showing a marked increase in ammonifying and nitrifying efficiency. The effect on the soils of Eastern Oregon is not so noticeable.

Incubation Investigations. A small amount of work has been done, the results of which are as yet incomplete.

HATCH INVESTIGATIONS.

Investigation of the Composition of Oregon Forage Crops and Grains. A small amount of work has been done. The arrangement of the work of the laboratory was such that not much time could be devoted to this subject.

Soil Analysis. This has been a continuation of the work already in progress. Representative samples of the different types of soil occurring in the Hood River Valley were analyzed. These samples were selected by the experts who made the soil survey of that county for the Bureau of Soils, U. S. department of Agriculture. The analyses of these samples revealed a grave nitrogen deficiency in many of the soils of that region. Some deficiencies in potash and lime were also found.

Fertilizer Control Work. Samples of simple and mixed materials have been collected from the market and analyzed. Practically no violation of the State fertilizer law has been found. The commercial brands of fertilizers now sold on the Oregon market have been licensed in accordance with the law.

Miscellaneous Work. This includes the various routine determinations which have been made for residents of the State. The samples examined consist mostly of feeding stuffs, mineral waters, and insecticides and fungicides. Practically all of the different brands of arsenate of lead, arsenite of zinc, and lime-sulfur solution now being sold on the market have been analyzed.

DEPARTMENT OF BACTERIOLOGY.

ADAMS INVESTIGATIONS.

A Study of the Activities of Oregon Soil Bacteria. The preliminary work has been done in this study and considerable time has been spent on the various problems of nitrogen fixation, ammonification, denitrification, and cellulose digestion. In cooperation with the department of Chemistry 500 routine determinations have been made.

HATCH INVESTIGATIONS.

During the spring, summer, and fall of 1912, records show that 315 cultures of bacteria for the inoculation of legumes were sent out by the department. This was a growth of over 100 per cent in advance of the year preceding. During the spring and summer of 1913, 620 cultures of this class have been sent out, showing an increase of 97 per cent over the culture distribution of 1912. Culture blanks were sent out in October, 1912, requesting that the results obtained, whether favorable or unfavorable, be reported to this office and a careful compilation of the reports sent in shows that direct benefit was derived in 69 per cent of the instances where the culture was used. This record is particularly good when it is considered that the soils in Western Oregon tend toward acid reaction, which condition is unfavorable both to the growth of such a crop as alfalfa and also to the micro-organisms necessary to inoculate the roots of the crop. In the eastern part of the State, in the semi-arid region, soil conditions are decidedly dry and there is considerable alkalinity. Both of these conditions; namely, dessication and the presence of an abnormal amount of acid or alkaline salts, are unfavorable to the life and activities of the seed inoculation organism, **B. vadicicola.**

Table II indicates the number of cultures sent out for each crop:

Table II. Number of Cultures of Bacteria for Inoculating Legume Sent Out for Each Crop, with Aggregate Acreage.

Crop	No. of Cultures	Acreage in Aggregate
Alfalfa	164	1008.50
Red clover	51	407.75
Alsike clover	5	15.75
White clover	3	4.00
Vetch	18	232.50
Garden peas	34	65.25
Garden beans	33	36.00
Canada field peas	4	13.25
Soy beans	2	1.25

Miscellaneous Investigations and Examinations. The general routine work of the department shows a large increase. Many specimens have been examined, consisting of water samples, submitted for sanitary examination by farmers and other citizens, human blood, chickens, faecal matter, hog tissue, milk and cream, pus, sputum, swabs, human tissue, human urine, vomitus, dog brains, turkeys, insect larvae, and bread crumbs.

A good deal of work of a laboratory nature has been done with chickens and other poultry. Avian tuberculosis is the disease most often met with in this connection. Certain lesions of peculiar and rather abnormal character have been found in chickens infected with this disease in this State. Not always are the tubercules fatter or calcarous, but sometimes they prove to be less firm, although the tissues do not show traces of breaking down, and are hardly at all fatty. Lesions of this character appear to be found more often in the messentery. In these cases the liver, which ordinarily is the tissue first attacked, seems to be comparatively free.

An investigation will be made of eggs from the College flocks and from flocks in the vicinity for the detection of possible carriers of the disease of young chickens known as "White Diarrhoea," the infecting form being **B. pullorum.** It is also desirable to examine the ovaries of possibly infected hens. Already a number of such birds have been found, and it is thought a decided benefit can be rendered to the poultry industry by such examination for the production of uninfected stock.

DEPARTMENT OF ANIMAL HUSBANDRY.

HATCH AND STATE INVESTIGATIONS.

Experimental Feeding of Swine.

The experimental work with swine has been fattening for market; testing the efficiency of the self-feeder for that purpose; and testing the relative efficiency of tankage and skim milk as adjuncts to barley. Equal nutrients rather than financial values from these two sources, were tried out in determining the requirements for producing 100 pounds of pork.

Experiment 1. Tankage vs. Skim Milk as supplemental Feeds. Initial weight, Lot 1, 675 pounds; Lot 2, 635 pounds. Weight at conclusion of experiment, Lot 1, 1344 pounds; Lot 2, 1243 pounds. Feed consumed for 100 pounds gain, Lot 1, 271.9 pounds barley and 631 pounds skim milk; Lot 2, 331.1 pounds barley and 35.11 pounds tankage. Cost of 100 pounds gain, Lot 2, $5.84. Value of skim milk for each 100 pounds gain in Lot 1, as compared with Lot 2, $28.29.

In the above table barley is estimated at 1½ cents a pound, tankage at 2½ cents. It will be noted that the cost of gains are low considering the cost of feed. On barley alone and assuming 450 pounds barley required for each 100 pounds gain, the cost of this gain would have been at least 90 cents greater, in comparison with which prices skim milk returns a value of 28.2 cents for each cwt.

Experiment 2. Self-Feeder vs. Hand-Fed. Lot 1, Self-Feeder, Lot 2, Hand-Fed. Feed required for 100 pounds gain, Lot 1, 512.2 pounds and Lot 2, 488.3 pounds.

Both lots received the same ration; viz., crushed wheat 5 parts, shorts 4 parts, tankage 1 part. The ration fed to the hand-fed was soaked twelve hours prior to feeding; that of the self-feeder was fed dry.

Experiment 3. Self-Feeder vs. Hand-Fed. In the second trial of the self-feeder a marked advantage in favor of the self-feeder lot was obtained. Since, however, the self-feeder ration was fed dry and the hand-fed ration was soaked twelve hours before feeding, a check on the effect of soaking is to be run in a subsequent experiment. Lot 1, hand-fed, Lot 2, self-feeder; feed for 100 pounds gain—Lot 1, 536.7; Lot 2, 417.9 pounds.

From the above summary it will be seen that the self-feeder lot ate more feed daily and gained more rapidly at a small cost of nutrients than did the hand-fed lot.

Experiment 4. An Experiment to determine the Cost of Production. Two Duroc Jersey sows, with nine seven-day-old pigs each, were purchased. The sows were estimated at $20.00 each, the pigs at $3.00 each. This is assuming an abnormally high birth cost, but in lieu of a more accurate one, this is accepted, it being the price at which the pigs were purchased. The fifteen pigs grown consumed from April 1 to August 15, 3,436.3 pounds of mill feed and the sows during the time of suckling the pigs consumed 1220 pounds, representing a total value of $122.68 or $8.74 for each hundred pounds of live weight of pigs. The ration consisted of wheat 5 parts, shorts 4 parts, and tankage 1 part. Tankage was estimated at $45.00 a ton, wheat $26.00, and shorts $30.00. Assuming a birth cost of $1.50 each for the pigs, the cost of production would be reduced to $6.81 for each hundred pounds.

Experiments with Sheep.

Experiment 1. To determine the Practicability of utilizing cull Ewes for the Production of early Market Lambs. Twenty cull ewes, some of them quite old, were selected. These were fed during the winter, in an open yard with shed. Owing to a total lack of pasture large quantities of hay and grain were required to maintain the ewes in good condition. The lambs came at irregular intervals and so were marketed at various times. Thirteen were sold at Easter time as hot-house lambs and brought a good price. The remaining seven were not sold until the end of June. Those sold for the Easter trade averaged about 40 pounds live weight, while those sold in June averaged over 70 pounds, but they brought approximately the same price a head. Two of the ewes died during the experiment, but considering age and character of the stock such a loss could not be considered abnormal.

Cost of ewes, $82.42; cost of feed, $149.68. Sale of ewes, lambs and wool, $191.51. Loss, $40.59.

Experiment 2. Shelter Test. The object of this test was to determine the advisability of keeping lambs under shelter during the winter. Eleven lambs were selected from the College flock and divided into uniform lots by the "pairing" system. The one odd lamb (Cotswold) was placed in the inside pen. Lot 1 were allowed the run of the entire farm and were fed in trough and racks in the open field. Lot 2 was kept in a shed with access to a small outside yard well-bedded with straw. With the exception of the odd lamb in the pen, all the lambs were thrifty.

Average gain for each lamb during the experimental period from December 3 to March 4, Lot 1, 27.75 pounds; Lot 2, 23.25 pounds.

While this test is too small to justify any definite conclusions, the results indicate that from the standpoint of the rate and economy of gain, those under shelter did much better during the rainy season, but that the best results of all were obtained from those outside during the good weather.

POULTRY HUSBANDRY DEPARTMENT.

ADAMS INVESTIGATIONS.

Incubation Investigations. The problems of incubation and rearing of the chicks are thought to be more intricate and difficult than any other in poultry keeping. The main purpose of this investigation is to learn, if possible, the cause of the loss from eggs that fail to hatch and the mortality of chicks. In cooperation with the department of Chemistry much interesting experimental data have been secured. Experiments on the influence of different degrees of humidity, both as it relates to the incubation of the egg and the vigor and subsequent growth of the chick, have brought out some important results, both from the practical and chemical viewpoint. It has been shown that the humidity surrounding the eggs during incubation has a highly important function to perform. This, taken in connection with ventilation of the incubator and the supply of oxygen, is probably the factor to be reckoned with in solving the problem of losses in connection with the hatching of chickens. Considerable data have been secured relating to the amount of carbon dioxide in incubators and under hens, and as to its function in incubation. A series of determinations has been made showing the effect of different degrees of humidity and ventilation on the chemical composition of the chick.

HATCH AND STATE INVESTIGATIONS.

Under the funds of these investigations, the work in breeding for high egg production has been continued. The results of this breeding work have been very encouraging and show conclusively that it is possible by selective breeding to increase egg production. Records since the work commenced, some five years ago, show an increase in yield each year. There is now a good-sized flock of layers with pedigrees dating back three years, and in some cases four years, from stock that laid 200 eggs a year or more.

The purpose of the work was in the first place to determine, or demonstrate, whether or not high egg-laying is transmitted from parents to offspring, and if so transmitted, what method of breeding should be followed by practical poultry breeders to secure the benefit of a higher egg yield.

In this work there has been used each year a flock of some 400 pullets and hens of two breeds of chickens, the Barred Plymouth Rocks and the White Leghorns. These breeds have been bred separately and breeding stock has been selected from them on the basis of their trap-nested egg records, covering from one to four years.

Another method has been followed, that of crossing the two breeds mentioned to determine what effect crossing has on egg yield and on vigor, and to ascertain whether high egg yield could not be more quickly achieved by developing a new strain or variety.

In connection with this primary object, it is thought that there is a demand for a type of fowls having, in the first place, high egg-laying as a fixed characteristic, and, in the second place, better meat qualities than the Leghorn. The Leghorn, on the one hand, is not a good market bird, and the Plymouth Rock, on the other hand, while a good market fowl, is too large for the general consumer. It is thought possible to add a little to the meat qualities of the Leghorn as well as to its egg production. With a type of chickens weighing from four to five pounds, the consumption of poultry will be very greatly increased. Results show that this ideal is within reach; that is, the egg records show a much higher yield than the average of either the original Plymouth Rocks or the Leghorns, while the meat quality is also such as better to meet the needs of the great body of consumers.

DEPARTMENT OF AGRONOMY.

HATCH AND STATE INVESTIGATIONS.

Rotation Experiments.

1. **Rotation of soil crops** for the continuous production of green feed throughout the year under Western Oregon conditions.

Results show, as heretofore, the possibility of maintaining, by means of the rotation advocated, a milking cow throughout the year upon every acre of average good Western Oregon land, and furnishing a continuous supply of green feed cut from the field every day in the year, thus permitting the most intensive sort of dairy farming. Under this system of cropping, it is possible to obtain a profit of from $50 to $100 an acre from land handled in this way devoted to dairying, with careful utilization of the by-products—the skim milk for the pigs and manure for increasing fertility. Under this plan the rotation is about as follows:

Vetch and rye from April 15 to May 15.

Vetch and oats and clover from May 15 to July 15.

Corn silage from July 15 to August 15 or September 1.

Corn (green) from September 1 to October 15.

Kale and mangels, and if desired, silage, from October 15 to April 15.

The use of silage for midsummer is rather a novel practice, but highly successful here, and more needed indeed at that season than in midwinter, the time when silage is generally used elsewhere.

New trials of soiling crops undertaken were mixtures of ceraels and vetch compared with cereals alone and vetch alone. The cereals alone gave both poor yields and poor quality for soiling purposes, while the mixture of cereals and vetch proved the best in varying degrees, according to the mixture. One of the seedings of rye and vetch yielded 10.3 tons of green feed to the acre. Crimson clover gave 10 tons of green feed to the acre, immediately following the vetch and rye.

2. **Fertility rotation.** To get the large block of plots required for this experiment into a uniform state of fertility, it was necessary to crop the plots as uniformly as possible throughout, in the effort to get them equalized, so that these experiments when they are started will give conclusive results.

3. **Experiment with Legumes.** The variety trial of vetches to determine the best seed producers was not continued. The seed is in storage and the experiment will be continued as soon as conditions permit. The trial of vetches as forage producers is considered practically concluded, the smooth vetch (**Vicia sativa**) common to all Western Oregon, having proved itself without question superior to all other varieties for Western Oregon conditions.

Variety trials with field peas; breeding of **Vicia sativa** for high protein content, and the propagation and maintenance of alfalfa under Western Oregon conditions have been temporarily discontinued.

4. Soy Beans. The variety test of soy beans has given some promising results. The first trials were rather discouraging, but the later results have been a good deal better. Two varieties, the Chernie and Tashing, matured well, as did some of the selections from the previous year.

Experiments with Cereal Crops.

1. Breeding of corn for grain and forage production under Western Oregon conditions. Forty-four varieties have been tested, and as heretofore the Experiment Station selections of Minnesota No. 13 were best silage and forage producers, while selections of Minnesota 23 were the best grain producers. The second-best forage corn, as heretofore, was the Northwestern Dent, while Early Bird and Brown County Yellow Dent also gave excellent results.

The second-best grain producer was the Dakota Sunshine. As previously, ear-to-row tests of both the Number 13 and Number 23 were continued. From the Station No. 23, yields ranging from 34 to 85 bushels an acre were obtained. From the Station No. 13, silage yields running from 7.4 tons to 22.1 tons an acre were obtained.

2. Variety Test of Cereals. The variety test of winter grains was suspended. Thirteen varieties of spring oats were planted, the yield ranging from 33 to 50 bushels an acre. The leading varieties were Dow's Pedigree Banner, Improved American, Widmer Three-Grain, Shadeland Challenge, and Shadeland Climax.

Of the spring barleys, twenty-three varieties were tested, ranging in yield from 15 to 35 bushels an acre. The leading varieties were Number 19785, 19786, Oderbrucker, Common Beardless (Wertz), Wisconsin No. 6, and Wisconsin No. 13.

The best yielding and best quality of spring wheat was obtained from the Pedigree Red Fife.

Kale-Breeding Experiment. For the second time the much-advertised marrow cabbage was compared with the selected thousand-headed kale, but the latter proved decidedly superior and further test of the marrow cabbage is considered unnecessary.

As heretofore, a number of selections of kale were made, inferior plants were destroyed in the seed plots, and a high quality of seed produced. The Station kale seed is in wide demand throughout Western Oregon, as hundreds of cooperative trials in every section have demonstrated it to be superior to common seed.

Potato-Breeding Experiments. The variety trial included twenty-seven varieties and a considerable number of selections. The leading varieties so far are the selected Burbank, Bovee, and Gold Coin.

Experiment to determine the Value of Irrigation to Western Oregon Crops, such as Clover, Alfalfa, Corn, Mangels, Kale, etc. Six years' data are available on eight different field crops, together with weather records and the results of several thousand soil-moisture determinations. Determination of moisture content of the soil and the evaporation from the water surface have shown themselves to be valuable guides as to the best time to irrigate. The results show that potatoes make a maximum yield if irrigated when the moisture content drops to twenty per cent in the first foot of soil, while with clover the most economical returns are had when it drops to fifteen per cent in the first two feet. The most economical returns for each unit of water applied have been secured from very light irrigations applied to soils of high fertility. Three 1-inch irrigations for potatoes gave 29 bushels for each acre inch. The effect of irrigation on the quality of potatoes was determined, showing no distinct effect as to edibility but a decided increase in the percentage of marketable potatoes where irrigation was used. Over-irrigation on the other hand caused an equally marked decrease in marketable quality.

A careful study of the effect of irrigation on the soil itself shows that with careful handling as to crop rotation, cultivation, and judicious use of water, the quality of the soil may steadily be improved, but with careless handling the quality may be greatly injured.

Using one dollar, which the data show is the maximum total annual cost for each acre inch, corn has given an average profit of 50 cents an acre inch, kale 75 cents, beets $1.18, alfalfa $1.75, beans $2.86, clover $2.87, carrots $3.74, and potatoes $7.63 for each acre inch of water applied. The mean profit for each acre inch as an average of all crops and including nearly 150 trials, has been $2.33. The average increase in yield by crops has been 54 per cent and the average depth of irrigation for each season 4.8 inches.

It is safe to say that this experiment proves conclusively that irrigation may be successfully and profitably practiced on those soils of the Willamette Valley which are well drained and properly managed as to rotation, cultivation, and limited use of water, particularly for such types of farming as intensive dairying, truck gardening, and hop growing.

A new test was started to determine whether electricity or gasolene is the better fuel for pumping. Although the gasolene proved somewhat cheaper for the actual cost, the saving of labor effected by electricity made this method the better of the two.

Rice-Growing Experiment. A test was undertaken to determine the practicability of growing rice under local conditions. All of the hardiest varieties which were furnished by the U. S. department of Agriculture were tried and all started well, but only a few plants in the entire lot got so far as heading out, and not a grain matured.

DEPARTMENT OF DAIRY HUSBANDRY.

Owing to the vast amount of work in dairy investigations which has been done by other experiment stations, thus in a measure restricting the field for technical work without duplication of effort, it was thought best to confine the work of this Station to the study of more local problems.

1. **Silage and Kale Feeding.** The use of kale as a winter forage crop is a very common practice in Western Oregon. The large yields, palata-

bility, and high protein content of the plant make it a most desirable forage. But there is much complaint over the matter of harvesting the crop in all sorts of winter weather, and of the resultant effect on the soil. Besides, the high protein content of the plant, when fed in conjunction with other highly nitrogenous plants, gives a ration containing an excess of protein. Some progress has been made with this investigation, but sufficient data have not been secured to warrant conclusions.

Soiling experiments have been continued, and it is contemplated to undertake an investigation of incomplete as compared with complete soiling systems. It is generally recognized that the soiling system is essential to the highest success on high-priced lands, but it has not been proved that the best results in milk and fat production with the individual cow can be obtained year after year under the complete soiling system.

2. **Advanced Registration.** The testing of dairy cows for advanced registration is supervised by the various experiment stations in the states where the animals tested are located. During the year 1912-13 the time of one man has been practically all occupied with this work, and considerable additional time of special testers has also been required. While all expenses of the tester are met by the parties for whom the work is done, considerable time is required in checking and verifying the tester's figures. Ten breeders of Jerseys have been testing for yearly fat estimates, and four Holstein breeders have made seven-day tests during the year.

3. **Grade Herd Investigations.** Cooperative work has been taken up with three different owners of good grade herds. Tests of these animals are made monthly and the owner keeps daily records of milk production, as well as data on amount and value of feed.

BRANCH EXPERIMENT STATIONS.

Burns Station. This farm is thoroughly established, with modern buildings and good equipment for work. The present year, being the first season, has been devoted to summer fallowed land under different methods of cultivation. Forty to fifty plots, however, were seeded, largely with the idea of showing the futility of attempting to secure a crop without the storage of a year's moisture. Yields of grain running from five to fifteen bushels were obtained, but in the main it was demonstrated that summer fallowing was necessary before a profitable crop could be grown. Eleven different varieties of the hardiest strains of alfalfa that could be found were seeded and showed conclusively that the most frost-resistant and the most vigorous variety was the Baltic. The Grimm proved to be the second best.

In the fall of 1912, summer fallowed land was seeded to all varieties of winter crops, and full experimental work started at that time. The following spring, all spring varieties, including a very large trial of field peas, were planted, and further extensive seedings of alfalfa were made. Plantings on the eight substations throughout Harney county have been started and a number of cooperative trials with farmers have been inaugurated.

One of the most remarkable results obtained at the Burns Station this year is the effect of the cultivation methods employed for moisture conservation and the deep storage of moisture. Practically all Central Oregon is underlaid at a depth of twelve to eighteen feet with a water-carrying strata. To farmers in that section has been suggested the possibility, by careful conservation of the precipitation, of bringing the surface moisture in conjunction with the capillary moisture rising from the water table. Borings have been made throughout the year and a number of wells dug purposely to observe this moisture movement. These examinations revealed the fact that on more than fifty per cent of the 200-acre farm, where thorough cultivation has been given, the surface moisture has already joined the moisture from the water table, while in the remainder of the farm, as a result of tillage methods, the two moisture areas are rapidly drawing closer to each other. This phenomena will practically convert a dry farming area into a sub-irrigated area. Since it is estimated that there are about 2,000,000 acres of tillable land in Central Oregon, having practically the same condition as the farm at the Burns Station, the value of this discovery is obvious. The process of connecting up the two moisture areas has continued during the winter, and in the spring of 1913 borings indicated that fully 80 per cent of the area of the farm was moist from the surface all the way down to the water table.

Moro Station. Cooperative work with the U. S. Department of Agriculture at the Dry Farming Substation at Moro has been continued as heretofore. The permanent plan of work as already reported has been continued except that more space has been allotted to field peas, alfalfa, and other diversified crops.

Field peas grown in double drill rows, 35 inches apart, gave yields as high as 26 bushels an acre, which at 3 cents a pound (the local price) gave a return of $46 an acre, at no greater cost of production than wheat, which gives an average return in that district of $15 an acre. Field peas, however, may be grown every year, whereas wheat gives the return named only every other year; further, the field pea increases fertility while the wheat decreases it.

Good results have been secured from alfalfa, a yield of one ton of hay to the acre being recorded, and the promise of abundant seed production is assured.

The results from the tests of a large number of varieties of cereals, including both winter and spring varieties of wheat, barley, oats, and emmer, are good in practically every case, showing the marked superiority of the Station varieties over those locally grown, the difference in yield in favor of the best Station varieties running anywhere from three to six bushels.

Excellent results were obtained from corn, the Station varieties proving the best, as heretofore.

Pasturing off field peas with hogs also proved a successful experiment, and one of widespread value. The pasturing off of corn with hogs is to be undertaken next year.

The complete list of experiments previously outlined, aggregating some five hundred different trials, will be continued the coming year.

Umatilla Station. A fairly complete report of the work of this station and the Southern Oregon Station at Talent is published in Station Bulletin No. 115; hence a list only of the principal problems under investigation at these stations will be included in this report.

At the Umatila station investigations have been undertaken in such problems as the clearing and leveling of new land; when to clear land; how to clear and level; applying irrigation; flumes and ditches; soil fertility; variety tests of fruits including the apple, pear, quince, prune, plum, cherry, nectarine, peach, apricot, and cane fruit, including currants, gooseberries, raspberries, dewberries, blackberries, loganberries, and other fruits and vegetables, including grapes, strawberries, asparagus, rhubarb, melons, potatoes, corn, eggplant, peanuts, and tomatoes. Experimental investigations have also been carried on in respect to cover crops, including field peas, vetch, espercett, red clover, sweet clover, alfalfa, crimson clover. Other forage crops tested were Kaffir corn, milo maize, sorghum, and millet.

Various phases of irrigation were studied, soil-moisture determinations made, trees for wind-breaks and ornamentals were tested, forest plantings and meteorological observations were also made.

Southern Oregon Station. The work reported last year has been continued and the most important new work is the very large planting of foreign pears, representing nearly 500 varieties. The purpose of this work is to secure stocks which are resistant to fire blight, and by means of selection and cross pollination it is thought possible to obtain good varieties of commercial pears that may also be resistant to blight.

Hood River Station. The work of the Hood River Station is well established, and laboratories are fairly well equipped for the investigations. The major work of this station is an investigation of what is commonly known as fruit pit or core rot. Work on the problem of fruit pit and winter injury is conducted cooperatively between the departments of Plant Pathology and Horticulture. In addition to the problems mentioned, apple scab, irrigation, some fruit pests, and orchard cover crops, are under investigation.

PUBLICATIONS.

Following is a list of the publications which have been issued during this biennium:

Bulletin No. 110—Preliminary Frost Fighting Studies in the Rogue River Valley.

Bulletin No. 111—Orchard Management.

Bulletin No. 112—The Soils of Oregon.

Bulletin No. 113—Orchard Irrigation Studies in the Rogue River Valley.

Bulletin No. 114—Hop Investigations.

Bulletin No. 115—Biennial Report of the Division of Horticulture.

Research Bulletin No. 1, Part 1—The Pollination of the Pomaceous Fruits.

Circular Bulletin No. 20—The Pollination Question.

Circular Bulletin No. 19—The Trap-Nest.

Circular Bulletin No. 18—The Hog and Field Pea Special—Swine Husbandry.

Biennial Crop Pest and Horticultural Report.

Respectfully submitted,
JAMES WITHYCOMBE,
Director, Oregon Experiment Station.

REPORT OF THE EXTENSION SERVICE.

To the President of the College,

Sir: I have the honor to submit herewith a report of the Extension Service of the College for the past biennium. I am also including a brief statement of the plans for future development.

ORGANIZATION AND JURISDICTION.

By order of the Board of Regents, the Extension Service was organized November, 1911, charged with the duty of extending the advantages of the College to the people of the State who are not in a position to undertake resident work. The organization, as defined, is one of the three main disivions of the College activities; namely, Resident Instruction, Experiment Station, and College Extension. The jurisdiction of the extension organization is defined as including all work carried on by the Agricultural College which is not a part of the regular resident instructional work or the regular experiment station service. It includes, in its present form, the following distinct lines of effort:

(1) The publication of bulletins, both instructional and news. (2) Correspondence courses. (3) Institutes, including teachers' institutes, farmers' institutes, and other special forms. (4) All exhibits at fairs and other special occasions. (5) Classwork and lectures at local chautauquas. (6) Movable schools of from three to six days duration. (7) Individual advisory work with the farmers of the State. (8) Officiating and judging at fairs. (9) Conducting conferences of from one to two weeks duration—one at the College, one in Eastern Oregon, and one in Southern Oregon. (10) The supervision and direction of the work of the county agricultural agents. (11) The supervision and direction of boys' and girls' industrial club work in cooperation with the State Superintendent of Public Instruction. (12) Special field dairy work. (13) An educational campaign for the prevention of hog cholera. (14) Farm management demonstrations and surveys. (15) Assisting in rural organization and the marketing of farm products.

In the last six named projects, the U. S. department of Agriculture is cooperating with the College. The last three projects named have not been in effect during the past biennium, but are now provided for and will be initiated at the beginning of the next fiscal year.

The administration of the extension service is vested in a Director of Extension and heads of the various departments of the service organized as the work is developed. These departments now consist of (1) County agriculturists in charge of a State leader of county work. (2) The department of industrial clubs in charge of a State leader of industrial club work. (3) The press bureau in charge of an editor of press bulletins. (4) The other lines of extension service such as itinerant lectures and schools, institutes, exhibits, individual advisory work and publications which are under the immediate supervision of the Director of Extension and the Secretary. These various lines of the service are closely related and harmonized to the end that a definite extension program may be carried out effectively and economically. The organization has been greatly strengthened and more nearly perfected during the past year, especially since the extension work of the United States department of Agriculture, carried on in Oregon, has been placed under the direction of the College extension organization.

Subject Matter of Instruction. The subject matter of extension instruction includes all subjects in the College curriculum which will lend themselves to extension methods. This represents, therefore, certain work in all lines of agriculture, home economics, commerce, engineering, forestry, as well as some general phases of applied science.

The State Law. The State law (Chapter 110, Laws 1913), which authorizes the College to do educational extension work and provides for the support of this service, is one of the most advanced and most effective laws passed by any state in the Union. The law, in brief, provides as follows:

(1) For general educational extension work throughout the State,—this to include itinerant lectures, publications, exhibits, and other methods necessary to carry out the purpose of the act. (2) It authorizes the various county courts to make appropriations for the support of agricultural demonstration and field work, provides that such appropriations will be duplicated by the State, and vests the direction of the work in the Oregon Agricultural College. The merit of this particular provision of the law lies in the fact that the work must be initiated through an appropriation by the local government, and, consequently, must represent a demand from the people immediately concerned; at the same time it provides encouragement by offering assistance from the State. By vesting the direction of the work in the Agricultural College, it establishes a guarantee that the work will be carried on in a uniform manner throughout the State, and in such way that all the forces working for the development of agriculture will be completely harmonized. (3) It further provides that in case Congress or the United States department of Agriculture should provide funds for extension work in this State conditioned upon a duplication by the State, such State money would become available. This has made it possible for Oregon to enjoy considerable advantage over other states in securing assistance from the Federal Government. (4) The law also encourages the development of industrial work in the public schools by directing the State Superintendent of Public Instruction and the State Agricultural College to cooperate in promot-

ing and supervising, in all of the counties of the State, the teaching of agriculture and home economics, the organization of school fairs, industrial clubs, school garden contests, and other forms of industrial work.

Extension Funds. The funds for the support of the Extension Service come from three sources: (1) The State, which appropriates $25,000 a year and duplicates (a) county appropriations for county agricultural work and (b) Federal appropriations conditioned upon such duplication. (2) The counties, which make appropriations for county agricultural work. (3) The United States department of Agriculture, which appropriated approximately $4500 for work during the past year. This sum will be increased approximately $13,500 for the next fiscal year. In addition to this, the State will profit by the appropriation made under the terms of the Smith-Lever Bill. (4) Beginning July 1, 1914, the Smith-Lever Bill, an Act of Congress appropriating $10,000 to each State the first year, and additional appropriations based on the rural population of each state, during each following year for a period of ten years.

GENERAL STATEMENT OF WORK OF PAST BIENNIUM.

While this law was passed in January, 1913, it did not become effective until June. Consequently, the work provided for has been in force for but a little over a year. In considering the report of work actually accomplished during the past biennium, it will be necessary, therefore, to keep in mind the fact that while the report covers a period of two years, the work was in full force only about thirteen months.

The following data are taken from the report of Mr. Collins, Secretary of Extension: During the biennium, which ended June 30, 1914, representatives of the College filled extension appointments in 230 towns and rural districts of the State, conducting institutes and demonstrations with a recorded attendance of 140,543 people. Probably as many more people were reached by means of exhibits, chautauqua lectures and demonstrations carried on in connection with judging at county, grange, and school fairs. Each of these meetings has been addressed by from one to five College speakers, the service requiring a total of 2,556 days.

Extension Bulletins. Extension bulletins totalling 341,900 copies under the 72 titles listed below, have been published during the period covered by this report. These bulletins have been prepared in clear, simple form without the use of technical terms, and with special application to Oregon conditions. The subject matter is not limited to experimental work actually carried on by the station force in Oregon, but represents a compilation of the best information available. It is the policy of the Extension Division to publish, from time to time, a list of these bulletins, which is circulated as widely as possible in the State. Those wishing the publications are requested to write to the institution for those in which they are interested. The titles of these bulletins and the number published in each instance are as follows:

Title	No. Published	Author
Breeds of Chickens (Reprint)	2,500	James Dryden
Camp Cookery (Reprint)	5,000	Miss Ava B. Milam and Miss Ruth Smith
Feeding for Eggs	5,000	James Dryden
Herd Record Keeping	5,000	W. A. Barr
Highway Construction	5,000	E. F. Ayres
Housing of Chickens (Reprint)	5,000	James Dryden
Incubating and Brooding (Reprint)	5,000	James Dryden
Industrial Contests for Oregon Boys and Girls	25,000	R. D. Hetzel
Legislation Providing for Agricultural Extension Field Work in Oregon	2,000	R. D. Hetzel
List of Bulletins	1,000	R. D. Hetzel
Principles of Bread Making	5,000	Mrs. H. W. Calvin
Principles of Cake Making	5,000	Miss Ava B. Milam
Principles of Jelly Making	5,000	Miss Ava B. Milam
Some External Parasites of Poultry	2,500	H. E. Ewing
The School Luncheon	5,000	Mrs. H. W. Calvin
Insect Pests of Truck and Garden Crops	5,000	A. L. Lovett

New Extension bulletins published during the fiscal year July 1, 1913-June 30, 1914, were 49 in number. Seven others were reprinted. Total number of copies was 253,900. Following are the titles, together with the number printed and the author:

Title	No. Published	Author
Industrial Clubs and Contests for Oregon Boys and Girls	50,000	F. L. Griffin
Insects Injurious to Timber	150	V. I. Safro
Fowl Tuberculosis	2,500	T. D. Beckwith
Septic Tanks and Absorption Systems	5,000	T. D. Beckwith-T. A. Teeter
Feeding the Dairy Cow	5,000	R. R. Graves
Raising the Dairy Calf	5,000	E. F. Bitts
Incubating and Brooding (Reprint)	7,500	James Dryden
Breeds and Judging of Dairy Cows	7,500	W. A. Barr
Housing of Chickens (Reprint)	5,000	James Dryden
Oregon Station Trap Nest (Reprint)	5,000	James Dryden
List of Bulletins (Reprint)	5,000	R. D. Hetzel
Breeds of Chickens	2,500	James Dryden
Feeding for Eggs (Reprint)	7,500	James Dryden
Farm Butter Making	2,500	O. G. Simpson
Care of Milk and Cream	5,000	O. G. Simpson
Silo Construction and Silage Feeding	5,000	W. A. Barr
Improving Oregon Dairy Herds	5,000	R. R. Graves and E. B. Fitts
Handling the Fruit Crop	7,000	C. I. Lewis-W. S. Brown
Growing the Oregon Potato Crop	7,500	H. D. Scudder
How and When to Spray the Orchard	5,000	H. S. Jackson-H. F. Wilson
Oregon Corn	7,500	H. D. Scudder
Treatment of Granular Vaginitis	400	B. W. Simms
How to Conduct a Fly Campaign	20,000	H. F. Wilson
Fruit and Vegetable By-Products	5,000	W. S. Brown
Feeding Young Chickens	5,000	Miss Clara Nixon
Making Babcock Test and Keeping the Records	5,000	W. A. Barr
Suggested List of Tools and Materials	5,000	H. C. Brandon
Enrollment Acknowledgments	1,000	F. L. Griffin
Hotbeds and Coldframes for the Garden	2,500	A. G. B. Bouquet
Sewing (Ind. Club No. 113)	2,000	Mrs. L. W. Robbins
Starchy Foods	1,000	Mrs. L. W. Robbins
Planning and Planting the Garden	2,500	A. G. B. Bouquet
Selecting and Caring for the Flock	2,500	A. G. Lunn
Feeding and Care of Dairy Cows	5,000	E. B. Fitts
Feeding for Pork and for Show	2,500	G. R. Samson
Questions on Lesson 1, Breeds of Chickens	1,000	A. G. Lunn
Creamed Soups and Vegetables	2,000	Mrs. L. W. Robbins
Essentials of Bread Making	5,000	Mrs. H. W. Calvin
Corn Growing, Project Circular	500	H. D. Scudder
Vegetable Gardening Project Record	2,000	A. G. B. Bouquet
Cooking Project Record	1,000	Mrs. H. W. Calvin
Pig, Project Record	500	G. R. Samson
Cultivating and Caring for the Garden	1,000	A. G. B. Bouquet
Sewing—Cotton Goods No. 134	2,500	Mrs. L. W. Robbins

Canning Project Record	2,500	Mrs. H. W. Calvin
Sewing—Ind. Club No. 141	3,500	Mrs. H. W. Calvin
Poultry Project Record	1,000	A. G. Lunn
Corn Growing Project Record	1,000	H. D. Scudder
Project Circular for Incubating and Brooding	1,000	A. G. Lunn
Sewing—Ind. Club. No. 160	350	Mrs. L. W. Robbins
Potato Growing Leaflet	1,000	H. D. Scudder
Circular Letter to Club Members	12,000	F. L. Griffin
Veg. Gardening Project (Reprint)	1,000	F. L. Griffin
Potato Growing Project (Reprint)	500	H. D. Scudder
Construction—Manual Arts Circular	2,000	D. G. Thayer
Project Circular No. 2-No. 131	1,000	Mrs. L. W. Robbins

Chautauqua Engagements. During the biennium faculty members have given lectures and demonstrations at ten local chautauquas in different sections of the State. In many instances as many as six instructors have been in attendance and have conducted regular courses of lectures and demonstrations throughout the chautauqua period. At several of these chautauquas special days were set aside as college days, or as farmers' and home-makers' days. Upon these occasions the programs for the entire sessions were turned over to the College representatives.

Correspondence Courses. Correspondence courses in Business Methods for the Farm, Rural Law, and Rural Economics, have been offered during the biennium and have been taken by 58 students. Additional courses will be instituted during the next biennium as described later in this report.

Special Demonstration Work. A great deal of special demonstration work has been done during the period of this report including the use of a demonstration train operated over the Southern Pacific lines in Oregon. The itinerary of this train covered two weeks and included 54 stops. The staff of lecturers and demonstrators was made up of seven members of the College staff, and five prominent and successful dairymen. More than 36,400 people turned out to see the demonstrations and listen to the lectures during this tour.

Special attention has also been given to demonstrations in the fields and orchards of the State. The work was started during the latter part of 1913, when two demonstrations were carried on with a total attendance of 250. During the last year this number was increased to 25 demonstrations with a total attendance of 1,959. In this service the demonstrators have gone into the field and actually carried on the work so that every detail might be observed by those in attendance. This has been very effective, especially in certain phases of fruit growing such as the pruning of trees and spraying for plant diseases and insects. This method of instruction has also been found very effective in connection with the home economics work. During the past year twelve special demonstrations in this subject have been carried on with a total attendance of 1,656. This does not include the great amount of work of this character that has been done in connection with the work of the movable schools. The instruction undertaken in connection with these demonstrations has been principally with cooking, home nursing, and dressmaking.

In August, September, and October of 1913 the College did a great deal of special demonstration work in connection with the campaign against fire blight.

Educational Exhibits. Educational exhibits have proved to be an effective method of instruction. The principal exhibit carried during the past two years has been that at the State Fair, where the College has occupied approximately 1,400 feet of floor space. The display each year has been inspected by almost every visitor at the Fair, and in many instances has been studied very thoroughly by persons interested in various branches of the work. The exhibits are designed to give suggestions of the best methods of procedure in agricultural production, home organization and management, and in other lines of industrial enterprise. Demonstrators and lecturers were in attendance throughout the week.

Moving pictures illustrating the proper methods of poultry raising and representing views of College activities were shown daily throughout the week both in 1912 and 1913. Several lectures on subjects of interest were also delivered by members of the faculty. These discussions included such subjects as farm credits, rural organization, farm homes, and various lines of agricultural production.

The College sent a vitascope showing views of the College work and farm scenes in Oregon, together with placards giving information relative to agricultural production and possibilities in this State, to the Chicago Land Show in both 1912 and 1913.

Special poultry exhibits were prepared and sent to the Albany Poultry Show January 6 to 9, 1914, and later to the Baker Poultry Show. The exhibit occupied practically 150 square feet of space and showed a model poultry house, hatching coops, different types of brooders and trap nests, suggested proper rations, illustrated the best methods of feeding and caring for poultry. A lecturer and demonstrator was in charge of the exhibit.

An exhibit consisting of about 100 varieties of nuts, several panels illustrating the proper processes of grafting, budding, and pruning, and suggestions for identifying and combating insect and fungous diseases, was sent to the National Apple Show at Spokane. The exhibit was in charge of a representative of the College staff who answered questions and helped to interpret the instruction conveyed by the exhibit.

Institutes and Lectures. During the past two years, 632 institutes and itinerant lectures, with a total attendance of 103,977 people, have been conducted under the direction of the Extension Service. The average attendance at each of these meetings was 164. Every county in the State has been visited—the demand for and distribution of the work bearing a direct ratio to the population. The institutes varied in length from one to six sessions. The College representatives spent a total of 982½ days in this branch of the service.

The classification of institutes and lectures showing the number of institutes, number of sessions, distribution of attendance and time devoted to the work, is as follows:

	Number	Sess.	Days	Attendance
Farmers	365	477	521	41,976
Special	238	362	385	56,454
Teachers	29	41	76½	5,547
	632	880	982½	103,977

Itinerant Schools. During five weeks of the summer of 1913 the College put out two special movable schools which traveled over the greater part of the State. One staff conducted two-day sessions in sixteen of the larger towns, giving instruction along lines of home economics, social hygiene, civic improvement, sanitation, pure foods, etc. The other party held a series of 29 one-day meetings in rural sections. The work of this staff included instruction in various lines of agriculture and home economics. Each staff was composed of from five to seven members. The College representatives were assisted by Mr. J. D. Mickle and Mr. M. S. Shrock of the State Dairy and Food Commission, Mr. E. J. Cummins, of the Oregon Social Hygiene Society, and Mrs. Orla Buxton, of the State Grange.

Judging and Officiating at Fairs. A great deal of time and service is required each year to officiate and judge at the various county fairs. In 1912 we were called upon to officiate at 32 fairs, and the following year this number was increased to 39. It required from one to four judges to do this work at each of the fairs. Our representatives judged the various agricultural and domestic science and domestic art exhibits. Wherever possible, the College people gave instruction in connection with the judging.

Itinerant Short Courses. During the biennium short courses of one week's duration have been held at Burns, Prineville, and Klamath Falls. The College sent three or four instructors in each instance and these were assisted by local speakers. The work covered instruction in agronomy, animal and dairy husbandry, and home economics. Laboratories were equipped, live stock was brought in, and classrooms were provided; so that those in attendance were given an opportunity to do actual practice work, as well as to see the demonstration and listen to the lectures. This type of instruction promises to be very effective and will be used to a much greater extent in the future.

COUNTY AGRICULTURAL WORK.

Up to the present time the following ten counties have taken advantage of the provision of the law authorizing and providing for the employment of County Agricultural Agents: Coos, Crook, Harney, Klamath, Lane, Malheur, Marion, Tillamook, Union, and Jackson. The appropriations made by these counties vary from $1500 to $2000, six having appropriated the larger sum. Several other counties have manifested interest in the work and are planning to take it up in the near future.

Organization of County Work. This branch of the Extension Service is being organized under the immediate direction of Professor H. T. French. The Bureau of Plant Industry, U. S. Department of Agriculture, is cooperating with the College to the extent of paying one-half the cost of this overhead supervision. This also gives us the advantage of the broad experience and the great fund of valuable information possessed by the Federal officials.

Since Professor French took up the work in September, 1913, he has devoted much of his time responding to calls from the various counties interested in the county work. He has found the farmers generally very appreciative of this new service and anxious to have it established in their counties. As rapidly as the people learn of the nature of the work, the demands for it increase. It has been necessary for the College officials to discourage the rapid spread of the work because of the difficulty in finding men properly qualified to give the best service.

Nature and Results of County Service. The County Agricultural Work has not been in effect for a sufficient period to demonstrate the maximum value of the service. Our limited experience, however, indicates that this will prove to be one of our most effective extension operations. The fact that the County Agent becomes a resident of the county makes it possible for him to become intimately acquainted with the people and to learn the peculiar conditions prevailing in his particular county, thus giving him a decided initial advantage. His acquaintance with the people and his knowledge of local conditions puts him in close sympathy with local problems and gives him a local point of view. This local acquaintance not only serves to make his own efforts more effective, but it makes it possible for him to choose wisely the sources of outside assistance, and to shape and adjust it so that it can be used to best advantage. In this respect the County Agent is proving a powerful factor in increasing the effectiveness of the work of the Central Extension staff of the College. The County Agent, who cannot be a specialist in all branches of agriculture, calls to his aid the specialists from the College staff and thus brings to his county the greatest possible service.

The nature of the work varies in different counties and with different agents. In counties where a certain line of agriculture greatly predominates, as does dairying in Coos and Tillamook counties, and fruit raising in Jackson, the County Agent is concerned principally in bringing this major line of work to the highest point of development. To this end the agents in the dairy counties have devoted most of their efforts thus far to the task of dairy organization, with the result that breeds are more uniform, poor dairy animals are being disposed of, better marketing arrangements are being perfected—in short, the dairy industry is being advanced. In counties where diversified farming predominates, the county men are working on such problems as proper crop rotations, better seed, the standardization of certain crops, better marketing methods, better business methods, etc.

The county agents are concerned with the social welfare of the rural districts as well as with the problems of production and marketing. The improvement of the rural schools, the encouragement of farmers' organizations, the promotion of social or community centers, and the rejuvenation of the rural church, are all matters that enlist the interest and services of the county man. In short, it is the business of the county agent to serve to his fullest capacity the real interests of the county in which he is located.

As was expected, the work of the county agents has met with criticism and opposition. It is safe to say, however, that in nine cases out of ten, this is due to misinformation, or lack of information regarding the work. As the work in the various counties progresses, the farmers are rapidly enlisting in the service, and in many instances we now number amog our most ardent and enthusiastic supporters those who were once our most caustic critics.

During the next year the organization of this work will be much more highly perfected, and, as a consequence, the work will be more effective and more far-reaching. Special attention will be given to organizing the farmers for certain definite purposes such as the production of uniform high-type, standardized seed potatoes, more and better corn, more and better clover; better marketing; the promotion of better social conditions—in short, the development of those interests which mean most to the welfare of the county.

At the present time many of the county men are unable to meet the demands made upon them by the farmers. Requests for every conceivable type of service come to them. To indicate something of the variety of these, and of the estimated value of this part of the service, I am quoting a few typical examples from the reports of the county agents:

Mr. Chapin of Marion County advised a grower to sow five acres of clover in a section where it was thought clover would not grow. The experiment was so successful that the grower sowed twenty acres more, and has purchased a number of dairy cows. In this community several hundred acres are now in clover representing thousands of dollars of increase in the yield and the value of land.

In Coos County, through the advice and assistance of Mr. Smith, five cow-testing associations have been organized, resulting in a great saving of money and improvement in the dairy herds.

Mr. Lovett of Crook County discovered a contagious infection among the hogs on the farm of one of his constituents, checked the disease, and saved the owner from severe loss.

Mr. Rader, of Lane County, upon analyzing seed which was about to be sown as rape seed, found it to contain 96.38 per cent mustard. In this case the damage would have been almost beyond calculation had the seed been sowed as intended. By planning farm crops and outlining a method of cultivation and the proper use of farm labor, Mr. Rader saved one farmer $100 in labor cost besides a liberal increase in crops due to change in methods of farming.

These instances could be multiplied without number, representing a service that will mean the saving of thousands of dollars to the farmers of the various counties, and a greatly improved method of farming which in the very near future should mean an income increased by a margin which we dare not estimate.

INDUSTRIAL CLUB WORK.

Another branch of the Extension Service that gives equal promise of being of exceptional value to the people of the State, is the Industrial Club Work. The Boys' and Girls' Industrial Club Work is the direct outgrowth of the Industrial Fair movement started during the fall of 1911-12. These Fairs were promoted for the purpose of interesting the boys and girls of the State in industrial education, and especially in the phases of industrial education that were immediately applicable to their conditions. The work was encouraged and supported by the State Bankers' Association, the Portland Chamber of Commerce, the Oregon Development League, and other organizations, and was promoted under the immediate direction of the State Superintendent of Public Instruction and the Oregon Agricultural College.

The Industrial School Fairs. The result of the first year's work was to stir up very widespread interest on the part of both the young people and the parents of the State. This was done by offering prizes for the best products exhibited at local school and county fairs, and at the State Fair. The prizes were furnished by interested individuals and organizations, and amounted to a total sum of approximately $20,000 the first year. It was estimated that approximately 75,000 children exhibited one or more articles at fairs during this time.

Reorganization. At the beginning of the second year, the work was reorganized so as to offer more definite instruction and direction. All concerned realized that if it was to become a permanent part of a constructive program for the development of industrial education, it would be necessary to provide for a definite program of instruction as broad in its scope as was the inspirational program of the year preceding. Accordingly, an agreement was reached between the Director of the Extension Service of the College, and the State Superintendent of Public Instruction, providing for a more extensive organization and a more substantial program of work. A State Leader of Club Work was employed by the College, and the work was organized as a part of the Extension Service. The State Leader, assisted by the two Industrial Field Workers employed directly by the State Superintendent, and in cooperation with the county superintendents and teachers, undertook the organization of Boys' and Girls' Industrial Clubs.

Nature of the Work. The nature and purpose of this work are well defined by the following quotation from the report by Professor F. L. Griffin, the State Leader: "Club work is based upon the idea of organizing into definite projects those major activities of home and farm, which lend themselves to this scheme of home and school industrial training. Each project contemplates a year's or a season's productive effort along economic and practical lines. The chores or duties that most children are obliged or should be compelled to do at home, and which are too often regarded as disagreeable tasks, are made attractive by breathing into each the spirit of science. The practical nature of the Club projects appeals to the average youth as he feels that he is doing a man's job. The fact that he may derive an income from his labors does not detract from the usefulness of the work. Often the parent is induced to enter into a partnership with the son, and the sense of proprietorship which comes to the junior member will do more to keep the boy on the farm than any amount of argument. The tasks and chores thus become a pleasure and enough of the natural competitive instincts of childhood are utilized to sustain the interest of the contestants through the contest period of several months.

"**Club Projects.** Ten definite farm and home activities were selected as a basis for the first year's Club work. Each of these was organized into a definite project which called forth constructive effort during a period of several months. The Club projects encouraged during 1914 were as follows: Corn growing, Potato growing, Vegetable growing, Poultry raising, Pig raising, Dairy herd record keeping, Sewing, Cooking, Canning, and Woodworking.

"Simple rules were made for carrying on each project and directions for doing the elected task were given in pamphlet form, prepared and distributed by the Oregon Agricultural College Extension Service. . . . . .

"**Organizing Clubs.** Industrial Clubs were formed in every school district in the State where there were enough boys and girls interested in the work. It was not necessary for a child to be a member of a local Club, however, in order to participate in the Club contests, as any boy or girl in the State, between the ages of 10 and 18, by enrolling with the State Leader, could undertake any Club project, receive all the Club publications issued for that project and be eligible to compete in any Club contest."

The County School Superintendents were recognized as the Club Leaders in their respective districts. Wherever possible, the teachers were induced to become the local Club Leaders, but where teachers could not be properly interested, an attempt was made to find some suitable person in the locality who would assume this responsibility.

Educational Prizes. It was found advisable and necessary to continue the use of prizes in order to stimulate interest and effort on the part of the young people. The so-called prize evil was minimized, however, as much as possible by reducing the intrinsic value of the prizes, and substituting therefor an educational value wherever possible. This was done by providing as prizes free trips to the State Fair, the Agricultural College, and the Panama-Pacific Exposition at San Francisco. This arrangement included as awards to the two boys in each county who received the highest rating for their Club work, membership in the State

Fair Camp and School, which was held at Salem this year for the first time. This was provided for by the State Board of Fair Directors, who set aside $500 to pay the expenses of the boys while in camp. The various counties raised the funds necessary for paying the traveling expenses of the boys to and from the Fair Grounds.

"Perhaps the best incentive that can be offered for Club Work, especially along agricultural lines," says Professor Griffin, "is the labor income that boys and girls can derive from their Club projects. It is possible for Club members to earn from twenty-five dollars up to several hundred dollars in a single season as the result of their vegetable, corn, potato, poultry, pig, or other Club work, and money earned in this manner carries with it a respect for labor, the formation of habits of thrift, and a knowledge of the possibilities of a small piece of ground well tilled."

Club Enrollment. Over 11,000 boys and girls enrolled for one or more Industrial Club projects during 1914, the total enrollment by project being as follows:

Sewing	3358	Corn	984
Canning	1332	Potatoes	939
Cooking	2065	Gardening	2745
Manual Arts	1166	Poultry	1429
Dairy	148	Pigs	485

While it is too early to determine the number who will continue the work throughout the season, indications are that it will represent a large proportion of those electing the work.

In promoting the work, thirty-eight Club circulars and bulletins have been issued. In addition to this, the publications of the United States department of Agriculture have been utilized, and a great many circular letters were sent to Club Leaders and to the boys and girls entering in the projects.

The United States department of Agriculture, through the Office of Farm Management, has joined with the Agricultural College and the State Superintendent of Public Instruction, in the support of the Club work in Oregon. This brings to the aid of the Club work the united Support of these three great educational institutions and makes possible a harmonious, vigorous, cooperative effort which should be an absolute guarantee of permanent and effective educational effort along these lines.

Results of Club Work. The following, taken from the report of Professor Griffin, indicates both the utilitarian and the educational purpose which lie back of the Club project work: "While the Boys' and Girls' Club movement in Oregon is less than a year old, results of a positive character are already discernible.

"In the Dairy Herd Record Keeping contest the Club members have in many cases obtained enough definite information concerning their father's or neighbor's herds to enable the 'boarders' to be culled out.

"The aim of the Poultry project is to build up better laying strains of fowls and help the members to market their eggs and poultry to best advantage.

"One result of the Corn Club work will be the demonstration that corn can be profitably raised in many sections of the State where it is not now regarded as a valuable crop. The improved methods of seed selection and cultivation taught the Club members, will become the common practice of the community.

"In the Potato Club work the standradization of the crop will be encouraged, and the increased yields resulting from the use of better seed and cultural methods will more than justify any expense this work involves.

"Hundreds of Oregon homes have been, and are, enjoying the use of more vegetables than ever before, because of the Garden Club work, and, to the extent that vegetables are raised and consumed or sold, the cost of living is being reduced in those homes.

"The Canning project encourages the Club members to save the fruits and vegetables that otherwise go to waste, and enables many a home to save food in times of plenty for the day of want. This same project also points out a way whereby many boys and girls can accumulate a bank account through the canning and marketing of garden and orchard products.

"Letters from Boys and Girls. That the Club movement is really getting a hold upon the boys and girls is evidenced by the hundreds of letters which they have written to the State Club Leader. When healthy normal boys and girls, upon their own initiative, take the time and energy to pen a two- to four-page letter, it is safe to say that the subject under consideration means something to them."

COOPERATIVE DAIRY WORK.

During the past fiscal year, July 1, 1913, to June 30, 1914, the Extension Service has carried on a special line of dairy work in cooperation with the Dairy Division of the Bureau of Animal Husbandry, U. S. department of Agriculture. The arrangement provides for the employment of two field dairymen, and the expense of maintaining the work is divided between the Federal Office and the College.

This work was inaugurated early in July with Mr. W. A. Barr in charge of Western Oregon, and Mr. M. J. Lazelle, located at Hermiston, in charge of the Eastern Oregon field. Mr. Lazelle did very effective work until his illness and death in the late fall of 1913. Mr. S. J. Damon was appointed to succeed Mr. Lazelle in February, 1914. Mr. Barr has been continually in the service since his appointment.

Nature of the Service. This work consists principally of advice and assistance to individual dairymen. The representatives, after becoming acquainted with the conditions under which dairying can best be promoted in the various communities, offer their assistance to the farmers who may be interested in the development of that branch of agriculture. They assist in organizing cow-testing associations, bull associations, breeders' associations, etc., and give assistance in planning and building silos, dairy barns, and other structures connected with the dairy industry. Mr. Barr has also taken a prominent part in institute meetings, short courses, and demonstration train service. The work of these field men has been a prominent factor in the increased interest in dairying and the improvement in dairy methods which has developed during the past year.

The dairy herd record work, which has been incorporated into the Industrial Club projects, was initiated by Mr. Barr. He first installed the work in the schools of Polk County. Since that time he has been called upon to assist in starting the work in Marion, Yamhill, and Jackson counties. A number of other counties have taken an active part in the work and promise to install the system some time during the next fiscal year.

The dairy field men have also prepared several of the Extension publications on dairying. In short, the work of these two agents has been so organized as to use their services to the best advantage in carrying on the general plan of dairy extension work in the State.

Provision has been made for the continuation of this work during the next fiscal year. The nature of the work will be practically the same as that during the past year. It is expected, however, that it will be even more effective because of the better organization of the entire Extension Service and the fact that this particular branch of the work will be more closely harmonized with the various branches of the Extension Service.

THE PRESS BUREAU.

A Press Bureau has been maintained at the College for a number of years and was taken into the Extension Service when that work was separately organized in November, 1911. The purpose of this bureau is to gather and disseminate through the newspapers and other publications information that would seem to be of immediate value to the people of the State. It affords a quicker, and in some respects, a better way of getting out information than the publication of regular Extension and College bulletins.

Extent and Nature of News Service. The service includes the publication of (1) a printed bulletin, four columns in width and approximately a column in length, containing from eight to fifteen separate articles each week; (2) special articles prepared and sufficient copies provided to mail to each of the several daily papers in the State, and to some of the special publications; (3) exclusive articles prepared for the publications, generally upon request, and representing special service.

The printed bulletin is sent to 159 Oregon weeklies, 13 general or special farm publications in Oregon, 300 daily or weekly papers in other Pacific Coast states, and 15 dairy publications. It is also sent to 63 general agricultural, 22 live-stock, 37 poultry, 13 horticultural, 7 home-economics, 17 technical, and 21 miscellaneous publications in the United States, and to 9 miscellaneous publications in foreign countries.

The service defined under heading No. 2, is furnished to 51 weeklies and 37 dailies in Oregon, and to 11 agricultural publications in other Pacific Coast states.

The special articles, as defined under heading No. 3 above, are sent to practically all of the Oregon dailies, weeklies, and special publications, when they contain matter of particular local interest. More than 500 of these special and exclusive articles have been sent to other Oregon papers during the year ending Jun 30, 1913.

Information of value to the people of the State is given very broad circulation through the use of the American Press Association, the American Type Founders' Company, and the Home and Farm Magazine, all of which represent patent inside, or plate service, to a large number of the smaller publications of the country.

Extent of Use. It is impossible to determine the extent to which this material is used, but indications are that it is drawn upon very extensively. During the period of time from July 8 to December 30, 1913, there were collected from the Clipping Bureau 920 pages of clippings. This probably did not represent more than half or three-quarters of the material actually used.

Value of Service. Something of the actual value of this work is indicated by the nature of a few of the articles, which Mr. McIntosh calls to my attention.

At an opportune time the Bureau published a series of articles on the clover midge, the destruction which it was threatening, and the best methods of combating it. Had the farmers of the State acted upon this advice, they would have been able to save many thousands of dollars worth of hay which later was wasted in an attempt to save it for a seed crop.

Just recently the Bureau published an article avising the farmers of the necessity of taking certain precautions in order to avoid the cutworm menace next year. In so far as this information is followed, it should represent a great saving to the farmers of the State.

Similarly valuable and suggestive articles have been published under such subjects as the canning of cracked cherries, feeding of pigs in order to supply the proper amount of protein, the use of by-products, advice as to methods of avoiding hog cholera, etc.

That this material is used by the various publications, and read by farmers of the State, is daily established by the fact that great numbers of requests for additional advice follow the publication of practically every article of this nature.

Most of the newspapers of the State have readily appreciated the value of this material from the standpoint of news service as well as its real value in correcting agricultural operations, and improving community conditions. We believe that this point of view will be accepted more generally by the newspapers as the merit of the work continues to prove itself. We also believe that the people of the State will constantly become more appreciative of the cooperative effort between the College and the newspaper editors in their behalf.

PLANS FOR THE NEXT BIENNIUM.

The past biennium has necessarily been principally a period of preparation, organization, and adjustment. It also has been a period of substantial accomplishment. Besides the extension service actually rendered as indicated in the first part of this report, there was prepared and passed by the legislature the best extension law to be found on the statute books of any state in the Union. An arrangement has been made with the United States department of Agriculture which gives Oregon the benefit of liberal financial aid and very helpful cooperation in the actual conduct of the Extension Service. The principal agencies within the State concerned with industrial education and industrial development have been enlisted with the College forces in a common campaign, so that the past biennium closes and the new biennium opens with great promise for effective, constructive work.

COOPERATION WITH U. S. DEPARTMENT OF AGRICULTURE.

The most important single factor in the organization of the work for the next biennium is the arrangement which has been perfected with the U. S. department of Agriculture for cooperative work. Under this arrangement the department is giving substantial financial assistance to the support of the work and is placing all of its extension service under the direction of the College extension organization. In this manner all extension work done in this State is harmonized and organized so as to bring about results without waste, duplication, or conflict. Under this memorandum the Bureau of Plant Industry is cooperating with the Agricultural College in the support of the overhead supervision of the County Agricultural work, the Boys' and Girls' Industrial Club work, and the Farm Management extension work. The dairy division of the Bureau of Animal Industry is cooperating with the College in maintaining the cooperative dairy work which gives to the State the services of two special field dairymen. The same bureau is also cooperating with the College in carrying on an educational campaign to prevent the spread of hog cholera. The Bureau of Markets and Farm Organizations is cooperating with the College in carrying on investigations along the lines of farm organization and marketing. The present plan contemplates placing a man in the field who would devote his full time to this phase of the work.

Smith-Lever Bill. The Oregon Extension Service, in common with that of the other states, will greatly benefit by the appropriations made by Congress under the provisions of the Smith-Lever law. This gives to the State the sum of $10,000 for the present fiscal year unconditionally. This amount will be increased by approximately $4,000 each year conditioned upon the State appropriating an equal amount. This money will be used in the promotion of practically all branches of the extension service, with special attention to field demonstrations and individual advisory service.

Industrial Development Conferences. An added feature of the extension service during the next year will be the one-week residence conferences which will be held—one at the College, one in Southern Oregon, and one in Eastern Oregon. These will be made the occasions when the leading farmers, business men, prominent women, and others will be brought together for the purpose of considering some of the pressing problems affecting the industrial development of Oregon, and particularly the development of rural interests. It will be the plan to determine upon definite campaigns of work which will enlist all of the agencies working in these particular fields and direct their endeavors along common lines.

Instruction More Intensive. It will be the policy during the next biennium to limit the amount of institute and itinerant lecture work as severely as possible and substitute therefor short courses of from three days to two weeks duration, community surveys, demonstrations, and visits to individual farms and farming communities. In other words, an attempt will be made to make the extension instruction more intensive.

Service Adjusted to Needs. In the agricultural phases of the extension work the County Agriculturists act as the local representatives of the Extension Service. With their knowledge of local conditions and their acquaintance with local people, they are in a position to aid the College in so directing and using the other extension agencies as best to supplement their work and best adapt the entire service to the actual needs of the State. For example, the county agen may decide that his county will greatly profit by interesting the farmers in growing greater areas of clover. In order that this line of enterprise may be encouraged and properly initiated there will be sent from the Agricultural College a man, who is an expert on clover culture, to hold conferences and meetings with the farmers of the county. The College could also aid in this campaign by publications on clover culture and by promoting the idea through the Boys' and Girls' Club work. This same thing would apply in organizing for better social conditions and in a campaign for the standardizing of products and better marketing facilities, etc. In short, with the county agents and the central staff of specialists, the Extension publications, and the Boys' and Girls' Clubs, all working in harmony, the Extension Service is in a position to give exceptionally valuable service to the farmers of the State.

Farm Management and Marketing. While in the past the College has been concerned primarily with the subject of agricultural production, the time has now come when special stress can best be put on the development of farm-management methods and marketing. In other words, the Extension Service will give particular attention to the problem of organizing our farms in such a way that they will produce the highest possible net labor income. At the same time the greater and more difficult problem of proper marketing organization and procedure will be given careful study, and as rapidly as conditions seem to warrant, aggressive organization work will be undertaken.

Social Problems. The social life of the rural sections, particularly the interests of the farm home, will also enlist a good share of the attention and energy of the service. An expert on home economics has been added to the staff and a supervisor of women's work has been employed to assist the State Leader with the Industrial Club work. Assisting these regular people are the members of the resident staff of the School of Home Economics.

While, because of the nature of conditions, the agricultural and home-economics work make the greater demands on the Extension Service, other lines of work will be promoted as extensively as practicable.

Extension Work in Engineering. A new undertaking during the fiscal year will be launched in the form of correspondence courses in several engineering subjects. This work will be handled in such a way that the students will have not only the correspondence instruction, but also assistance from regular instructors who will meet the classes periodically—probably once every week. Short courses and lectures in mining engineering subjects will be offered in different sections of the State. In this manner the College hopes to reach many of the young men of the State who will not have an opportunity to take up resident work at any of the institutions, but who wish to prepare themselves for advancement in the trades or in the engineering professions.

Cooperation and Assistance. I take pleasure in making acknowledgement of the special cooperation received from the office of the State Superintendent of Public Instruction, especially in the prosecution of the Industrial Club work; and also, in this same connection, of the splendid work of the county superintendents and the teachers. In fact, the Club work has been dependent very largely upon the activities of local people, principally school officials. This has made it possible to develop the work in this State in a very short time to a high degree of effectiveness. We have also enjoyed the hearty cooperation and support of the State Bankers' Association, the Oregon Development League, and many prominent men and women of the State.

The generous cooperation and support given to the Service by the railway companies has made possible a much more extensive service than could otherwise be maintained. All the railway companies of the State have granted transportation to the College representatives while performing extension work. As the service has grown, the demands upon the companies for transportation have reached very great proportions. During the past year the Southern Pacific Railway Company has also cooperated with the College in operating a special demonstration train through Western Oregon. It is sincerely hoped that the companies will be able to continue their cooperation in the future.

In the development of the work, the farmers' organizations, especially the Grange, the Farmers' Union and the Farmers' Society of Equity have been most helpful. Their membership is drawn very largely from the more progressive farmers in the various communities, and consequently their cooperation is of particular value. The Extension Service is anxious to receive their continued support and particularly invites their advice in the direction of the extension service. The entire purpose of the service is to serve the people of the State and, in a large measure, the farmers. For this reason, we are very anxious to have their advice and sympathy. If they will continue to cooperate with the College representatives, it will make a working arrangement which will be most effective in attacking our agricultural problems.

Respectfully submitted,
RALPH D. HETZEL,
Director.

REPORT OF THE SCHOOL OF HOME ECONOMICS.

To the President of the College,

Sir: I have the honor to submit to you the following report relating to the School of Home Economics, which heretofore has been denominated the School of Domestic Science and Art.

The change in the name of the school became effective September 1, 1914, and is in agreement with the report made by the committee on Instruction in Agriculture to the Association of American Agricultural Colleges and Experiment Stations. The new title places the school in line with other similar schools in Land-Grant Colleges.

Student Enrollment. The increased student enrollment has been most satisfactory. By reference to the last previous report, it will be observed that an estimate for the year 1913-14 was placed at 325 students in the regular courses in Home Economics. By a peculiar coincidence the actual enrollment for that year was 326.

A most encouraging fact was that at least 90 per cent of those entering this school had completed a full four-years high school course. With better student preparation, a much better type of college instruction becomes possible.

The records of the year 1914-15 will show at least 400 women enrolled in the classes in Home Economics, while 500 is too conservative an estimate for the year 1915-16. There is every reason to expect this rapid increase to continue for a number of years, since there is no rival institution on the Pacific Coast proving so attractive. A constantly increasing number of students are attending from the neighboring states of California, Washington, and Idaho; and young women are coming from distances as great as Indiana and Kansas.

Graduates. As a result of previous adjustments of courses, there were but 21 graduates in June of 1913, but the June class of 1914 numbered 46 in Home Economics. Of these 30 have been elected to teaching positions, with salaries varying from $75.00 to $100.00 a month. Many of the others did not desire to teach. Almost all positions as teachers of Domestic Science and Art in the State are now filled by graduates of this school and their success is most gratifying.

It is especially desirable that new fields of endeavor be opened to our graduates, and that they be prepared for these; with this end in view, certain modifications of the courses in Home Economics have been made.

Resume′ of Courses of Study. The courses in Domestic Science and Art were administered during 1913-14 on the same lines as during the previous year, but some minor changes were needed in arranging the work for 1914-15 owing to the raised entrance requirements. During the past few years students have been expected to specialize in either Domestic Science or Domestic Art from the beginning of their Junior year. Under the new plan there will be a well-balanced course of required work up to the close of the Junior year, with liberal electives in the Senior year.

There has been a constant demand from many parts of the State for a course of less duration than the degree courses, that would train for efficient home making. Such a course we now have; and while it greatly increases the work and responsibilities in the Home Economics School there can be no question of its success. Forty women entered this course when the work was started for the first time in September, 1914, and their enthusiasm continues unabated. Four mornings each week are spent in food preparation and in discussions relating to the purchase and economical use of foods. Four afternoons are occupied by lessons in sewing and in the study of textiles. Household linen, under garments, and dresses are worked upon; and the lectures include discussions relating to the manufacture and wearing qualities of fabrics. Special attention is given to house sanitation and the care of the home, to the care of children, and the care of the sick. So popular has the course proved, that it may be necessary to raise the age of eligibility for entrance in order to limit the numbers enrolling.

Special instruction is now being offered in Institutional Management and in Cafeteria Service. These two fields offer splendid opportunities for trained women, and at present are poorly supplied with untrained workers.

Mrs. Brooks, Professor of Domestic Art, makes the following recommendation concerning a Trade Course for Dressmakers:

"The apparent need for seamstresses and dressmakers in Oregon makes it advisable at this time to consider the introduction of trade courses that will fit a girl, after one year's attendance, for immediate service. The lack of room in the new building makes it impossible to inaugurate such a course this fall—with the opening of the second semester it is hoped that such a course may be started if a room can be provided. The idea would be to start a class in September and one in February, so that we could launch a class for the fall and spring trade."

Night classes for women have been so popular that double sections have had to be organized and the Camp Cookery classes have required the evening attendance of two teachers. The Winter Short Course of 1914 was so largely attended that many of the regular classes were of necessity shortened that these students from the outside might be accommodated in classroom and laboratories. Farmers Week also found many women in attendance. In such emergencies, both in order to relieve the local teachers and to awaken a greater interest, the use of outside lecturers is recommended.

Summer School Classes. Almost all women students who attended the Summer School enrolled in courses in Home Economics. It is the desire of the faculty of this school greatly to widen the scope of the work offered in the summer session, and to raise it to the standard of graduate study for our own and other college graduates. It may be necessary to obtain special instructors for this session, owing to the fact that our regular teaching force is greatly fatigued after the regular year of work.

Extension Work. During the earlier part of this biennium all extension work in Home Economics was done by the regular teachers. This added to the usual burdens of the teachers and in a degree lessened their classroom efficiency, but the arrangement had certain advantages of too great importance to be overlooked. Of inestimable value is the knowledge of the State, of home conditions of the students, and of opinions and desires of parents, gained by the teacher who goes out upon extension service.

In July 1913 a regular extension teacher in Home Economics was employed. This arrangement diminished the outside demands upon the College teachers, but so rapidly has state-wide interest in Home Economics developed, that much service in the field is still required of the regular teachers. Seven instructors have given part time to this outside service.

Many requests for correspondence courses relating to household matters have been received, and it is the desire of those in the School of Home Economics to cooperate with the Extension Service that such courses may be established.

Personnel of the School of Home Economics. No considerable changes in the teaching force have occurred during the last two years. One additional teacher was restored to the Domestic Science department in the fall of 1913, by the return of Miss Ruth Smith from a year's study in New York. One additional instructor, Miss Bertha Davis, has been employed to take charge of the Home-Makers' Course and Miss McCall, resigned to be married, has been replaced by Miss Christie Moore.

In Domestic Art, Mrs. Olivia Schilling assumes the duties carried by Miss Barbara Moore, the latter having gone to New York for study; Miss Helen Peer takes charge of certain new work together with that which was heretofore handled by Miss Elta Raber, who resigned for further study; and Miss Cora Platt has been called to assist with the general increased teaching.

The success of the School of Home Economics has resulted in great part from the devotion and united efforts of its corps of teachers. Real growth can only be attained where definite policies exist, and an unsettled teaching force can never bring about such a condition.

The burden of responsibility has been divided as equally as possible, but has been extremely heavy in all cases; and long-continued, effective, and enthusiastic teaching can not be expected from over-worked people. A larger teaching force, with a vacation long enough for advanced study and real recuperation, is an absolute necessity; otherwise the teachers will cease to progress and will lose interest in their duties.

Additional Instructors Required. In Domestic Science two new teachers will be needed in the fall of 1915. This is partly because of increased student attendance and partly because the administrative duties of the Dean's office have increased so rapidly that part of the teaching heretofore combined with the office duties will have to be carried by other instructors.

The Domestic Art department will also require additional teachers—two or more instructors in case the Trade course is instituted, and probably two under ordinary conditions of growth.

A well-trained woman in Institutional Management will be needed to give requisite instruction and to administer the affairs of the cafeteria.

Salaries. If the integrity of the present faculty of the Home Economics School is to be maintained, a decided increase in salaries will be necessary. The instructors have been giving splendid service and their value is recognized by other institutions. Permanency of the teaching force is the most desirable of conditions, but this cannot be attained with dissatisfaction of salaries. Loyal service results from the conscious recognition that continued devotion to duty and increased efficiency is rewarded by adequate remuneration.

New Home Economics Building. The first wing of the New Home Economics Building was completed in the fall of 1914. This excellent structure adds greatly to the comfort and convenience of both students and teachers. No better accommodations are afforded any school of Home Economics west of the Mississippi River and no school in the entire United States has better or more suitable equipment. There are more expensive buildings and more elaborate equipment in some other institutions, but none which so thoroughly meets the needs of the students and so facilitates the teaching of the subjects grouped under the head of home economics.

So rapid has been the growth of this school that by the end of another year every portion of this splendid structure will be used every hour of the day and the imperative need of the completion of the entire building will be felt. The present wing was not designed to accommodate permanently the lecture classes, nor to afford ample office room; since it is expected that the center section will afford this type of space; hence, the central administrative portion of the building is greatly needed.

The center section will provide adequate class room, an increased number of offices, a much needed assembly room, which will accommodate large meetings of women, and which can be converted into a banquet hall when so required. Provision must be made for senior women to have practical household experience. It is desired that an apartment be provided in this administrative section for the establishment of a model home wherein the students may work under conditions as nearly those of a real home as possible. Many problems in housekeeping could thus be solved.

Work of this kind is being done in many of the best institutions; Pratt Institute has a city dwelling, Teachers' College a typical apartment or flat, Wisconsin University, University of Illinois, and the Agricultural College of Iowa each have residences of ordinary home size.

In these houses the women of the various schools work out the home problems. At present no provision is made for such instruction in this institution, but it must be made, if we are to keep abreast of the work given by other schools.

The completion of the west wing will afford ample room for the large classes in Domestic Art, and their removal from the present wing will afford room for the needed expansion in the Domestic Science department. The new wing could be planned to accommodate the women's classes in Art and place them closer to the Domestic Art department to which they are allied.

New Departments. Some slight readjustments and re-classification of work is deemed advisable. Much of the Art work now given in the College is entirely for women. It is closely related to the problems in Home Decoration, Basketry, Costume Design, and Handwork and Weaving. It is respectfully suggested that a department of Applied Design be created in the School of Home Economics. This department should include the freshman courses in Art now required in the Home Economics School, and such other courses as design, metal work, china painting, basketry, costume design, and house decoration.

Home Administration is receiving increased attention among all students of Home Economics, and as soon as the center section of the new building can be completed, this line of study will merit recognition by the organization of a department of Home Administration.

The School of Home Economics should be organized to have four divisions instead of two as at present, these being Home Administration, Applied Design, Domestic Science, and Domestic Art. This division would increase the efficiency of organization and prepare for the certain rapid growth.

Equipment. The present equipment is all that could be desired in quality and type. With the opening of the cafeteria, the establishment of a practice home, and the construction of the new wing for Domestic Art, however, a considerable amount of new equipment will have to be purchased.

With a strong, loyal, thoroughly prepared teaching staff, the unvarying support and assistance of other College departments, satisfactory housing conditions for the students, and a commodious and well-equipped Home Economics building, there can be no question of the position this school can maintain when compared with other institutions.

Experimental Work. It is eminently fitting that the School of Home Economics carry out a series of experiments relating to home problems. So little actual information exists concerning household matters that a great field is open to some institution to establish a department of household experimental work and to publish the results of their investigation.

Exhaustive studies relating to the cooking qualities of various Oregon apples at different seasons of the year, have been carried out, and the results published both in a technical and a popular form. Studies relating to pears and also uses of loganberries, are now under way.

Plans are made for experiments with the common Oregon fuels, to determine their comparative economy and efficiency; and other work will be done with various "labor-saving" devices. Limited funds and insufficient help prevent the extension of this experimental work; but with these difficulties removed, great opportunities for service will be afforded. The full-time service of a truly scientific woman should be devoted to this work, with sufficient funds for materials, labor, and equipment, to place the department on a par with the various agricultural experimental departments.

Clerical Work. An increasing volume of correspondence is coming to the office of the Dean. The women of the State are availing themselves of our willingness to reply to all inquiries relating to home matters. This is as it should be; but it entails many hours of office work. Files have been prepared for all bulletins received, a system of records relating to graduates and their occupations and salaries is developing. A complete file of all extension lectures is maintained for future reference and facts relating to student matters are in orderly and accessible form. It is necessary that the clerical force be increased, since under present conditions only the Dean has the time of a stenographer. Other members of the faculty have many occasions for business correspondence as well as for preparation of material for publication, and should have clerical help at their disposal.

State Service. Members of the faculty of the School of Home Economics have actively interested themselves in State and National organizations. They have prepared papers, presided at meetings, and served on committees. By these various means the instructors have widened their influence and increased their efficiency.

Respectfully submitted,
HENRIETTA W. CALVIN,
Dean of the School of Home Economics.

REPORT OF THE SCHOOL OF FORESTRY.

To the President of the College,

Sir: In common with nearly all the Forest Schools of the United States, the course of study of the School of Forestry of this College was primarily shaped to prepare men for work in the Federal Forest Service. This was the natural thing to do, since the Federal Service was practically the only agency supplying employment to technically trained foresters. Nearly all of the men who have left the School during the past four years are employed in some branch of Federal forestry work.

Courses in Logging Engineering. During the past two years, however, the more progressive of the timbermen of the State have become convinced that the industry they represent can be greatly benefited by the service of men specially trained to meet the peculiar requirements of the timber business. The School of Forestry, cooperating with a committee from the Pacific Logging Congress, an organization of all of the prominent timbermen of the Pacific Northwest, worked out a course of study designed to prepare young men for service in getting timber from the woods to the mills. This Logging Engineering course received the official approval of the Board of Regents last year. In the development of this course it will be the policy of the School of Forestry to keep in close touch with the leading lumbermen of the State to the end that it may meet as fully as possible their special needs. For valuable assistance along this line the School of Forestry is greatly indebted to J. S. O'Gorman, H. C. Clair, J. C. Van Orsdel, J. D. Younge, and Geo. M. Cornwall.

Three Fields of Work. As at present organized, the School of Forestry has two distinct lines of work. The first deals with the reproduction, protection, and care of the forest. The second has to do with harvesting the mature crop. Coordinate with these two departments should be a third, the utilization of timber. This course should deal with the manufacture of lumber, and the marketing of the manufactured product. Considering the immense amount and great value of the forest crop of Oregon, it is clear that the College has an opportunity to render great service to the State in preparing men to get the most material of the highest value out of our timber resources.

Growth of the School. The following figures, beginning with the College year 1909-10, indicate the increase in the enrollment of the School of Forestry:

1909-10	22
1910-11	31
1911-12	38
1912-13	67
1913-14	86

These figures show a very lively interest in forestry work generally. That the numbers in the School have increased is a matter of surprise, in view of the competition of other forest schools, housed in adequate buildings and supplied with the necessary equipment, making known their advantages through special forestry publications.

Oregon's Opportunity in Forestry. I believe this College should have the largest and best forestry school in the United States. Oregon has more standing timber than any other state in the Union. Practically one-fifth of the timber remaining uncut throughout the country is within the borders of our State. Yet, while other industries and professions have received recognition at the College by the provision of suitable buildings and equipment for their peculiar needs, the timber industry, as represented by the School of Forestry, remains practically wtihout suitable housing or equipment. If the College is to play the part it should in preparing young men for efficient service along all industrial lines, proper provision should at once be made for caring for the forestry work. Failure to do this will seriously impair the efficiency of the service which the College can render to the State.

Employment of Graduates and Students. It is a matter of great satisfaction to note that every graduate of the School who desired to follow the profession of forestry, has found satisfactory employment. Some of our graduates are connected with the State work, some are in the Federal Forest Service, while others are employed by logging and milling companies. The School is fortunate in that the most cordial cooperation exists between it and the lumbermen and Forest Service. Nearly every member of the School, including students in the freshman class, have been able to secure employment during summer vacations. This not only aids the men in securing money to defray College expenses, but,—and this is decidedly important,—it gives them practical field experience that is of inestimable value as a supplement to college work. The personal interest which the most prominent practical loggers of the Northwest are taking in providing employment for forestry students, is a hopeful sign that the School of Forestry is playing a part, however small, in increasing the efficiency of those who are engaged in the lumber business. More than 20,000 men are engaged in the timber industry in Oregon. The School of Forestry can, and should, provide the leaders for this industrial army.

Need for Building and Equipment. To do this, buildings and equipment must be provided. Without these, instructors are at a disadvantage; for they are without the means of imparting instruction in the most efficient way. Without them, our students are at a disadvantage because they do not receive the preparation required by other properly equipped schools. Without them, in short, it is impossible to do efficient work.

Summary. The original aim of the School was to prepare men for the Federal Forest Service. During the past biennium, by reason of the initiative and cooperation of the practical timbermen of the Pacific Northwest, this aim has been broadened to include the preparation of students to harvest the timber crop. It should be still further extended to include instruction in the manufacture and marketing of lumber. The growth of the School of Forestry since its establishment as a College department in 1909, has been remarkably constant and cumulative. This growth, together with the unequaled timber resources of the State, points to the conclusion that Oregon's peculiar and distinctive opportunity is leadership in Forestry. This leadership, however. is dependent upon the provision of adequate buildings and equipment to insure efficient demonstration and instruction.

Respectfully submitted,
G. W. PEAVY,
Dean of the School of Forestry.

REPORT OF THE SCHOOL OF ENGINEERING AND MECHANIC ARTS.

To the President of the College,

Sir: I have the honor to submit to you the following report of the School of Engineering and Mechanic Arts for the biennium ending June 30, 1914. I feel that the past two years have marked a substantial advance in the work of this school. The work in the various departments of the school has been improved and standardized in accordance with the best practice of technical schools. The faculty have been working together in harmony for the best interests of the College, and particularly for the advancement of the engineering departments. The better preparation of our freshman students noted in my last report, has been an important factor in the successful work of the past two years. No radical changes in the courses of study have been in operation during the past two years, but a number of important changes are to go into effect with the opening of the College in September, 1914.

Equipment. During the year just closed the expenditures for equipment in the School of Engineering have been as follows:

Civil Engineering	$ 342.05
Electrical Engineering	1296.74
Mechanical Engineering, including the shop and laboratories	5356.82
Total	$6995.61

The greater part of the amount accredited to Mechanical Engineering was used to install and equip a steam engineering laboratory at the heating plant. Among the items in this laboratory may be mentioned, a corliss engine, steam tribune, compound engine, and a surface condenser.

Student Enrollment. The total enrollment of students in the courses of the School of Engineering is practically the same as it was two years ago as shown by the Registrar's records quoted below.

Degree Course—	1911-12		1913-14	
Civil Engineering	71		63	
Electrical Engineering	68		74	
Mechanical Engineering	61	200	98	235
Secondary Course—Mechanic Arts	61		33	
Total		261		268

It will be noted from the statement above that the number of students taking the degree courses has increased 17.5 per cent, while the number taking the secondary courses has decreased 46 per cent.

Faculty Changes. Prof. G. V. Skelton, head of the department of Civil Engineering, was placed in charge of the department of Highway Engineering at the beginning of 1913-14. It is our purpose to advance and build up this work as rapidly as possible. Two lines of work will be followed,—one representing the engineering educational side, and the other, extension service among the people of the State. For the present, Professor Skelton will divide his time between these two lines of endeavor.

Last November, Professor E. P. Jackson, who had charge of the woodworking department, including both College class work and the manufacture of equipment, resigned his position as Professor of Technical Woodwork in order to devote his full time to the manufacture of equipment and the superintendency of the College buildings. This relieved a situation that had long been unsatisfactory, on account of neglect of College class work for work on equipment and repairs.

C. L. Knopf, who had been in charge of the machine shop for a number of years, was last February transferred to the testing laboratories of the department of Experimental Engineering, the purpose of the transfer being to increase the efficiency of the service in both shop and laboratory. At the same time, Mr. Buyers, who had been appointed instructor in the engineering laboratories in September, 1913, was transferred to the machine shop; ill health, however, prevented him from entering upon his new duties, and later he resigned.

New Appointments. T. A. H. Teeter was appointed Assistant Professor of Civil Engineering, and assumed his duties early in September 1913. His work covers the subjects of irrigation, water supply, water power development, drainage, and other problems coming under hydraulic engineering. During the past year, however, it has been necessary for Professor Teeter to carry some of the other work in civil engineering, in order to equalize the work of the department.

H. C. Brandon, formerly principal of the Portland Trades School, was appointed Professor of Industrial Arts and Director of the Shops in November, 1913. This appointment was made on account of the transfer of Professor E. P. Jackson to the superintendency of buildings.

At the April meeting of the Board of Regents, Professor R. H. Dearborn, head of the department of Electrical Engineering at the University of Oregon, was elected Professor of Electrical Engineering at the College to begin his duties July 1, 1914. Professor Dearborn will devote the larger part of his time, as heretofore, to the work of the Public Utilities Commission. The increase in magnitude and diversity of work has made it necessary to add several new instructors for next year as follows:

In Civil and Highway Engineering, D. R. Smith.

In Experimental Engineering, R. R. Boals.

In Industrial Arts, W. F. Maddison in the machine shop, and one not yet selected, in Electrical Construction.

Non-Resident Lecturers. It has been the policy of the school to provide a number of lectures each year, by non-resident professional men, for the more advanced students in the several engineering courses. During the past year a number of men in positions of responsibility in the work of engineering, railway and power operation, and the State service, have addressed the students upon subjects of special interest to the profession.

Great benefit has been derived from these lectures. The expense has been merely nominal, never amounting to more than the actual expenses of the speaker. The advantages derived from personal contact with these dynamic workers in the field of practical engineering, however, has been beyond price. It is our intention to continue the lectures, and widen their scope if possible.

New Courses. By order of the Board of Higher Curricula, the course in Civil Engineering is subsequently to be discontinued, but courses in Highway Engineering and Irrigation Engineering are offered as degree courses, leading to the degree of Bachelor of Science in Highway Engineering and in Irrigation Engineering respectively. The two-year secondary course in Mechanic Arts has been abandoned and in its place a three-year vocational course in Mechanic Arts has been established. This course is intended to meet the needs of young men who are unable to take a degree course in College, but who desire educational training above the eighth grade which shall fit them for specific vocations or trades. Outside of the city of Portland, where the Trade School fills this function, there is no provision made in this State for the very large number of young men who are annually leaving the eighth grade and taking up the duties of life in the trades, to continue their education with special reference to their chosen work. We believe that the College has a duty to perform towards these people, which it can only fulfill by offering them advantages afforded by this vocational course.

In addition to the new courses already mentioned, the courses in Electrical Engineering, Mechanical Engineering, and Industrial Arts have been greatly improved and strengthened in accordance with the higher entrance requirements which are to go into effect in Sept., 1914, and in Sept., 1915. This is not to be accomplished by adding a large number of subjects to the courses, but by concentrating upon those already given. The number of semester credits having been reduced to 16, this will make it possible to do more thorough work.

Highway Engineering. The work in highway engineering is being taken up, both with reference to College work and extension service, with a view of preparing young men to enter this somewhat new field of engineering work, and also to assist road supervisors and others in building and maintaining, to best advantage, the roads under their care. Probably in no other line of public work has there been so much economic waste as in the building and maintenance of the country roads. In this State we are just now taking cognizance of fact, and beginning the construction of permanent highways. It is hoped that the College will turn out graduates who will be capable and efficient in promoting and supervising this important work. It is also our desire that the extension service in this department should reach every part of the State and render assistance in building and maintaining better earth roads, which after all must be depended upon, for many years to come, as the principal thoroughfares of the rural districts.

Irrigation Engineering. The development of irrigation projects in our own and adjoining states, makes it imperative that more attention be given to irrigation engineering, than heretofore. Hence a separate department has been established to deal with the engineering side of irrigation work and other hydraulic enterprises, such as water supply, drainage, and power development. By training men to enter this service, whether under the direction of the State Engineer, or in private enterprises, we believe we are but fulfilling a duty imposed upon us by the natural conditions existing in our State.

Industrial Arts Department. As it is now organized, this department includes all of the shop instruction given in the College. It also offers a degree course in Industrial Arts for those who wish to prepare themselves to teach or supervise manual training work in the high schools or lower grades of the common schools. It is hoped that the transfer of the Industrial Arts course from the department of Industrial Pedagogy will unify and strengthen the work, without in the least detracting from the value of the pedagogic training afforded by the course.

Service Departments. While all departments in the School of Engineering act as service departments to each other, there are two lines of work in which service to other departments is the principal function. These are the engineering laboratories and the shops. The work of these two departments is by no means limited to the Engineering School, but touches many other departments in the College.

Experimental Engineering. The engineering laboratories have hitherto been conducted as a part of the department of Mechanical Engineering, but have been equipped and operated in such a way as to serve the needs of Civil, Mining, and Electrical Engineering, as well as the School of Forestry. By this means duplication of equipment and work in different departments has been avoided, and better service rendered to all than would have been possible had engineering laboratories been established in each of these departments. I believe the results obtained fully justify a continuation of the plan. In order to give the work more independent recognition, and increase the efficiency of the organization, the department of Experimental Engineering has been established and charged with full responsibility for the continuation of this service.

Shops. The shops are now well organized under the department of Industrial Arts, and as soon as one or two vacancies in the instruction force are filled, it is believed that this important adjunct to the engineering school will be in better condition than ever before to render efficient service to the various departments of the College. The addition of the vocational work should greatly increase the efficiency of the shops without increasing the cost of maintenance; since the equipment will be in use during a greater part of the time. Better results will also be obtained in building equipment and apparatus for the College.

More Room. The question of additional room for the Engineering School has been mentioned in former reports, and all that has been said there still holds true. There are now additional reasons, indeed, why this matter should receive early attention.

The discontinuance of engineering courses at the State University, will not only greatly increase the number of students taking up engineering at the Agricultural College, and thus demand more room for their accommodation, but it also makes the College the official engineering school of the State and places the full responsibility upon it. In accepting this responsibility we should provide the necessary room and equipment to maintain our position with efficiency and dignity. Another reason why more room is needed at once is the fact that the engineering laboratories have been obliged to distribute their equipment through three different buildings, in order to find shelter for it;—the materials and cement laboratory in Mechanical Hall, occupying room needed by other departments; the gas and compressed air equipment, in the old power house; and the steam laboratory, temporarily installed at the heating plant on the south side of the campus. The apparatus of this department should be grouped together in a building designed for the purpose, where the different lines of work could be carried on simultaneously under the direction of the department. Such a building might accommodate other work, and relieve pressure in other departments, but the leading feature should be the engineering laboratories. I sincerely hope that funds will be available for this purpose before the close of the present biennium.

Respectfully submitted,
G. A. COVELL,
Dean of the School of Engineering.

REPORT OF THE SCHOOL OF MINES.

To the President of the College,

Sir: I have the honor to submit the following report concerning the School of Mines since its organization up to June 30, 1914.

BRIEF HISTORY OF THE MINING DEPARTMENT AND BUREAU OF MINES.

For the past six years the department of Mining Engineering has been one of the departments of the School of Engineering. In any state where mining is an important industry the work of mining engineering is more closely allied with an important basic industry or fundamental source of wealth than other engineering branches. This fact coupled with the additional fact that Oregon's mineral development is, and has been, quite backward, made it necessary for the Mining Engineering department of the College early to undertake, as its chief work, the investigation of the State's mineral resources. Since this work bears very little relation to the work of the other engineering departments, it was thought best to segregate the Mining department from the School of Engineering and establish it as a separate school. This change in the organization of the engineering work of the institution was made on July 19, 1913, when the Board of Regents authorized the establishment of the School of Mines.

The 1913 legislature passed a bill providing for the investigational work of the State, to be governed by a commission to be known as the Oregon Bureau of Mines and Geology Commission. This statute carried an appropriation of $40,000 for the first two years and authorized the Commission to appoint a director and staff to continue the investigational work along mining lines already inaugurated by the Mining department. This Commission appointed the Dean of the School of Mines Director of the Bureau, and, upon his nomination, appointed the complete Bureau staff.

This is a very important mile-stone in the development of the investigational work in connection with the mining industry of Oregon, since this act of the Legislature made available, for the first time, an appropriation which was adequate to cover the immense field of needed research. Oregon has been backward in her mining activities as compared with other states on the Pacific Coast, due largely to a lack of accurate knowledge concerning her resources. Now that the work of investigation is well started, we believe that it should and will be continued until the limits of the State's mineral resources can be adequately determined. The School of Mines must necessarily grow in direct proportion to the development of the mining industry, and the geological investigations which are being carried on will contribute largely to the growth of the mineral as well as agricultural and other industries of the State.

FACULTY OF SCHOOL AND STAFF OF BUREAU.

The law providing for the Oregon Bureau of Mines and Geology above mentioned stipulates that, as far as possible, the laboratories of the School of Mines be used for the investigational work of the Bureau. It was found desirable to employ, as far as practicable, members of the School of Mines faculty on the staff of the Bureau. In this way the School work and the Bureau work are kept closely interrelated and mutually helpful. At the present time the following members of the School of Mines faculty are employed jointly by the School and the Bureau:

Henry M. Parks, Dean of the School of Mines, Director of the Bureau of Mines and Geology.
Ira A. Williams, Professor of Ceramics in the School of Mines, Ceramist for the Bureau.
Arthur M. Swartley, Instructor in the School of Mines, Mining Engineer for the Bureau.
Sidney W. French, Instructor in the School of Mines, Metallurgist and Chemist for the Bureau.
George E. Goodspeed, Jr., Instructor in the School of Mines, Assistant Geologist for the Bureau.
G. M. Butler is employed full time as Associate Professor in the School of Mines.

DEPARTMENTS OF THE SCHOOL.

There are at present three authorized departments in the School of Mines; namely, Mining Engineering, Ceramic Engineering, and Chemical Engineering. The instructional work in the first two years of the degree course is identical in the three departments. At the beginning of the junior year, the School of Mines student has the opportunity to choose his major in either one of the three departments leading to the degree of Bachelor of Science.

Mining Engineering. The technical work in the department of Mining Engineering is designed to give the student thorough training in the essential fundamentals of the sciences of mining and metallurgy. The field for the mining engineer in the State is increasing rapidly, partly due to the steady development of the industry but more because of the intimate contact maintained between the active mining men and the School of Mines faculty through their investigational work. Such constant contract accounts very largely for the evidences of confidence and support on the part of the mining men.

The Ore Dressing laboratory, which is just being completed, is used largely by the Department of Mining Engineering. This laboratory is being equipped with some of the more important units of concentrating machines, such as jigs, concentrating tables, and vanners, as well as a model cyanide plant, and numerous auxiliary pieces of apparatus at a cost of about $1,500. This will make it possible, for the first time in the history of the School of Mines to do experimental and demonstration work along the lines of ore testing and concentration.

Ceramic Engineering. Ceramic Engineering is the application of chemistry and engineering to a well-defined group of non-metallic mineral industries; namely, clay-working, glass manufacture, and cement manufacture. These industries all produce silicate products, employing the same raw materials to a large extent, and thus constitute a natural division of chemical technology. The ceramic engineer should be something of a geologist and mining engineer in order to discover and work his raw material; he should be a mechanical engineer to prepare these materials and to manufacture them in the required shape; and he must be a chemist to understand what takes place in his kilns and furnaces. His course, therefore, while founded upon chemical technology, must be broad and varied and include a large amount of general engineering.

The work of this department is at present, and probably will be for some time, closely allied with the large amount of investigational work carried on by the Bureau of Mines and Geology. Such vital connection with the practical field and its problems, is especially valuable to the student, since it furnishes him an opportunity to see and to study larger and more varied phases of the ceramic industries than would otherwise be possible. The Ceramic laboratory occupies a commodious room in the basement of the Mines building and is equipped with full-size machines for making all kinds of ceramic products, including kilns for burning, also a complete set of apparatus for the analysis and testing of both the raw materials and the finished articles. This equipment has all been installed within the past year, at a cost of more than $4,000, and is without question the best equipped ceramic laboratory west of the Missouri river.

Chemical Engineering. The course in Chemical Engineering has been prepared to meet the growing demands for trained men in the numerous industries which employ chemical processes prominently in their work and which are not included in the fields of metallurgy and ceramics. Among such may be mentioned the manufacture of acids, alkalies, salts, paints, dyes, soaps, glue, starch, sugar, preservatives, antiseptics, fertilizers, paper, artificial illumination and heating gas, and others. The demands along the lines of chemical engineering will evidently grow as the manufacturing industries suggested in the above list are developed. Since most of the work in Chemical Engineering is closely related to the metallurgical and chemical work of the School of Mines, it can be cared for without the addition of a large amount of expensive equipment. It seems desirable, therefore, to develop this department as fast as the progress of the industries related to it in this State seem to warrant.

Geology. In the School of Mines there is really a fourth department, although at present no degree is offered; namely, the Geology department. The instructional work given in this department, including crysallography, blow-piping, petrology, mineralogy, and geology courses, are, with a few exceptions, given to all students in the School of Mines. The facilities and equipment in the Geology department are steadily being augmented by very helpful material. The close touch which the department has with the large amount of State investigational work, makes it possible to add materially to its collections and equipment both in quality and quantity.

It has been for some time a matter of regret to me that the Geology department in the School of Mines is not used more by the departments outside the School of Mines. We offer at the present time an elective course in Agricultural Geology; and I am strongly of the opinion that all agricultural students who take agricultural chemistry should have as an accompanying or following course, one in Agricultural Geology. With this combination, their chemical knowledge would be of much more service to them. It is possible for the student, with the three-credit subject offered in Agricultural Geology, to become familiar with all of the common types of rocks, as well as to gain an understanding of the processes by which those rocks break down into soils. I am thoroughly convinced, therefore, that the Agricultural student cannot afford to be without this fundamental course, which is right at his door.

There are offered, also, in the School of Mines, general geological courses which could be taken by students as general cultural training. In most institutions of this character the general geology subjects are quite popular with women students. It is my desire that everything possible should be done to make certain courses in the School of Mines as useful to the College at large as they should be.

BUILDING AND EQUIPMENT.

The new, commodious Mines building was completed in the fall of 1912. This building affords, for the first time in the history of the Mining department of the institution, adequate housing, and furnishes sufficient laboratory space for the different phases of its work. The larger part of the laboratories and equipment of the School of Mines is used in all three of the departments. For example, the crushing and grinding laboratory, assaying and metallurgical laboratory, as well as the mineralogy and petrology laboratories and draughting rooms, are used by all departments and students in the technical work in the School of Mines.

The equipment of the new Geological Museum has just been completed. It includes twelve glass-topped cases of attractive design, each nine feet long and two and one-half feet wide, and of the proper height so that material contained therein can be easily seen and studied by the observer. In these cases will be placed systematized collections of the most attractive minerals and rocks that are available, which will be known as the School of Mines' Exhibit Collection. In the base of each of these cases are twelve drawers which will be used for filing different educational collections. In addition to these, there are fifty-five feet of wall cases, six and one-half feet high and about twenty-eight inches deep, also of attractive design, having the shelf space arranged in steps so that different-sized material can be shown to advantage. These cases will be largely used to exhibit manufactured products and art ware representing the ceramic, metallurgical, mining, and chemical engineering industries.

The total registration of students in the School of Mines for the year 1913-14 was as follows: fourteen freshmen, eight sophomores, four juniors, and three seniors.

Respectfully submitted,
H. M. PARKS,
Dean of the School of Mines.

REPORT OF THE SCHOOL OF COMMERCE.

To the President of the College,

Sir: I present herewith a report on the work of the School of Commerce for the past biennium, and the requirements for the next biennium.

INSTRUCTIONAL WORK.

The registration in the School of Commerce for the past two years has been 338. This enrollment keeps up the usual ratio between the registration in Commerce and the total registration of the institution. The enrollment in Commerce is usually about 10 per cent of the entire enrollment of the College.

There has been a remarkable growth in the Commercial work required of students in other departments. As a service department, the School of Commerce ranks first in the institution.

The alumni of the School of Commerce have been increased by twenty-four graduates during the last two years. The large number of regular students now enrolled in the lower classes points to a steady growth of the senior class. The success of the graduates in a great variety of vocations is very gratifying.

Regular Courses of Study. A number of important changes in the Commercial Courses will be found in the present College Catalogue as compared with last year's. This is due partly to our new entrance requirements, demanding three years of high school credits for 1914-15, and partly to the fact that the Board of Higher Curricula limits the work of the School of Commerce to undergraduate courses, except in the field of Rural Economics. Every effort has accordingly been made to make each course as practical as possible, with special reference to the various industrial departments of the College. Eighty-two courses will be offered next year.

New Courses. The School of Commerce has been a consistent advocate of the development of farmers' business courses on a more extended scale than is found in any other school, with the possible exception of the University of Wisconsin. I believe that the time has come when a special degree course should be offered to be known as the Farmers' Business Course, where considerable latitude should be given in th selection of courses throughout the entire four years of college work. No restrictions should be placed on this course; there is no reason why the advanced degrees should not be offered. A number of additional courses will be required in Rural Economics, Farm Management, and Business Administration, which cannot be outlined here.

Winter Courses. The work offered by the School of Commerce in the Winter Short Courses has not met with the encouragement in attendance that was expected. This is probably due largely to the great number of courses offered, and also to the fact that thus far an attempt has been made to give considerable laboratory work. An attempt will be made next year to condense these courses into a few lectures by each department, and to leave the practicums to be worked out by correspondence. An effort will also be made to conduct a lecture course for business men in connection with the short course.

EXTENSION WORK.

Correspondence Courses. The correspondence courses in Farm Accounts and Business Methods, Rural Economics, and Rural Law have been offered with very satisfactory results. Fifty-eight students have enrolled since my last biennial report. A second edition of my bulletin on Farm Records has been exhausted and a third is being prepared. In 1913 Dr. Macpherson wrote a significant and timely bulletin on Practical Problems in Rural Economics, and Regent E. E. Wilson is at present preparing a bulletin on Rural Law, a revision of a series of lectures which he has given at the farmers' short courses. Several other bulletins on the Business Side of Farming are planned and will be ready for the press in the near future.

In addition to his regular College duties, Professor Macpherson has given a great deal of his time and energy to Extension work. This included meetings of committees such as the Oregon Problems Committee appointed by Governor West, committees of farmers' organizations, and a joint committee representing the State Grange, Farmers' Society of Equity, Farmers' Union, and Oregon State Federation of Labor. Then, too, he delivered some thirty lectures, at which there was an approximate total attendance of 4,000 people, exclusive of the attendance at lectures given during Farmers' Week and the Short Course at the College.

Bureau of Markets. It is the aim of the department of Economics to "develop a practical system of aid in the formation of all kinds of farmers' organizations." The problem of marketing farm produce is receiving increasing attention by both the State and Federal governments. The great farmers' organizations are asking for assistance in the solution of this important problem. It is the aim of the department of Economics to be of the utmost possible service in helping to carry on this work in Oregon.

The Oregon Statistical Bureau, under the direction of the Dean of the School of Commerce, completed the work assigned to it by law in the Spring of 1912, and as a result of its work an exhaustive report entitled "The Oregon Farmer" was published by the Oregon Immigration Commission in an edition of 25,000 copies. Unfortunately, no appropriation was made by the last legislature for continuing the work.

The Bureau should become a part of the proposed new Bureau of Markets.

An extract from Doctor Macpherson's Report gives an outline of the plans and purposes of the Bureau: "The Bureau contemplates attacking certain definite problems during the coming year, with certain of these as major problems, and the others as supplementary. We may outline tentatively the proposed field of activity for the next biennium under the following heads:

(1) Rural Organization
(2) Business Efficiency
(3) Surveys of Methods and Costs
(4) Business Propaganda.

Under each of these heads, we propose to accomplish something definite each year.

"(1) Rural Organization: In this field, we propose to cooperate with the leaders in the rural organizations in establishing and perfecting the 'Oregon Farmers' League,' which shall be a federation of all organized farmers. In the establishment of local business units, we shall endeavor to assist any neighborhood or group of farmers calling for assistance. It appears to me, however, that for the special task which we shall push aggressively throughout the year, we shall single out the organization of Farmers' Exchanges at convenient shipping points throughout the State for the purpose of grading, packing, and shipping in good shape the products of the adjacent territory.

"(2) Business Efficiency: The work in this division will cover considerable scope. It should begin with the individual farmer, and encourage in every way possible, through the County Agriculturists and through occasional visits by our accounting expert, the keeping of accurate farm records. These records could be worked out on the individual farms as part of the laboratory work in Dean Bexell's course in Farm Accounting, or might be undertaken by any farmer having the necessary training in accounting. Such sets of accounts might cover the operations of the whole farm plant, or they might be undertaken in a much simplified system for single farm products, such as potatoes, hogs, dairy cattle, etc. These single crop records, it seems to me, could very profitably be made a part of the work of the boys' and girls' clubs now being organized all over the State. The results obtained in this way would greatly build up at the College a body of reliable data on the actual results obtained on Oregon farms. In order to get this material, the College could well afford to supply blank forms and paper for bookkeeping sets on condition that the records be kept in duplicate, one copy to be furnished the College at the end of each business year.

"Besides the work with the individual farmer, the Bureau proposes to work towards a uniform system of accounting for all farmers' organizations. Our accounting expert should be put to work immediately upon the problems of creamery accounting, cannery accounting, warehouse bookkeeping, etc. Here again it is proposed that we furnish organizations with blank forms for a series of reports running from month to month, and from year to year, so that the progress of each organization can be definitely followed and checked up.

"(3) Surveys of Methods and Costs: In addition to the material received through our accounting systems, it will be necessary to gather certain data at first hand through out accounting expert, or through the various members of our extension staff, our Station staff, and superintendents of branch experiment stations. An example of what we should do is our Potato Cost of Production Survey, which we are undertaking now. We have obtained a considerable number of schedules filled out. If we could put a man in the field for about two weeks, we could finish this one matter, and check up at first hand on the results which we have gathered in from a variety of sources. One of the cost-survey problems which we could undertake is a cannery survey, covering the complete operations of the canneries of Oregon for the season of 1914. This would give us a mass of invaluable information in estimating the future possibilities of canneries, driers, and vinegar plants in taking care of the by-products of our fresh-fruit industry.

"(4) Business Propaganda: No improvement in the present farm business methods can be accomplished without persistent educational effort. The people of the State must have their interest aroused. We must keep at them until a desire to cooperate for economic and other purposes becomes firmly rooted. We can accomplish this by lectures before all kinds of farmers' meetings, and the various farmers' organizations of the State. We can do something towards it by means of bulletins and press notices. We can probably do most towards bringing it about by personal contact with the leaders in local organizations, convincing them of the advantage of our plans, and in turn, letting them work with the members of the organizations in which they are leaders. Then, too, a few successful organizations in every county will go a long way towards popularizing better business methods.

"In the following estimate of expenses for the coming biennium, I have included one stenographer and office assistant at a salary of $55 a month for the first year, and $60 for the second year. We should have, I think, one of our own graduates, trained in commerce, who can take charge of the classification of survey schedules, sets of accounts, and everything else coming into the office, besides attending to correspondence. We have in view two young ladies at the present time who would answer these requirements very well, indeed.

"I have placed next an accounting expert, who would also work upon cost surveys, and in devising simplified account systems for farmers, as well as various types of business and industry coming within the scope of our office. I have estimated that we could obtain such a man for $1300 for the first year, allowing $100 raise for the year following.

"The next in our labor force should be the marketing expert. The salary for which we would be able to obtain a man for this position would depend entirely upon his ability, experience, and college training.

I have placed the estimate at $1800 for the first year, and $2000 for the next. Of these amounts one-half will be paid by the National government.

"The next item, including printing, paper, accounting forms and books, I have placed at $300 a year. Besides, we should have one, or perhaps two, new office desks at $28.50 each.

"I have not included traveling expenses in this estimate, since much of our work done in the field would, it seems to me, come either under Extension or Experiment Station work, and it would appear that these divisions of College activity should continue to bear that expense."

THE FACULTY.

There are ten members in the present faculty of the School as follows: department of Business Administration, J. A. Bexell, E. B. Lemon, R. M. Howard; department of Economics, Hector Macpherson and E. J. Brown; department of Political Science, U. G. Dubach, Chester Maxey, J. B. Horner; department of Office Training, C. I. Blanchard, and Neil Baldwin.

Additional Help Required. In my report on the departments of Instruction, you will see that a very much heavier demand will be made on the School of Commerce next year by other departments of the College. Laboratory work is more than doubled. There will probably be an increase of at least 50 per cent in the number of students doing work in the School of Commerce. Some relief is given us by the departments of Mathematics and English, who will take over the Commercial Arithmetic and Business English, respectively.

The minimum additional help required for instructional work next year is two instructors. One instructor, classified as Instructor in Political Science, will do part work in Economics; another, classified as Instructor in Accounting, will give about one-third of his time to Economics. The Bureau of Markets will require at least two full-time, high class, men, and a stenographer.

A stenographer should be employed to do the clerical work of the School and to assist in the work in correspondence instruction. We can secure a fairly competent beginner in stenography at $50 a month. The Extension Service has agreed to bear half the expense of this stenographer, in consideration of the work in correspondence instruction and extension work by the School.

DEPARTMENTS.

Business Administration. The work of the department of Business Administration consists of twenty-four courses in various subjects relating to Business Management, Advertising and Selling, Accounting and Auditing, Farm Accounting and Business Methods, and Home and Private Finance. Farm Accounting is given in four sections and Home and

Private Finance in four. Four hundred thirty-nine students were enrolled in the various courses during the first semester last year, and 293 during the second semester. Approximately one-half of the work is given by the laboratory method, which requires a much larger proportion of the instructor's time in the classroom than the lecture method.

Economics. Extracts from Doctor Macpherson's Report: "During the year, seventeen different courses were offered in the department, in which there was a total attendance of 566 students. Besides the regular work of the department, courses of lectures were offered during Farmers' Week and the Short Course. These courses, covering in a general way the current economic problems of Marketing and Farm Credits, as well as three special lectures by Dr. Brown on such general problems as the Currency Law and Income Tax, were well attended.

"A special feature of the year has been an attempt to establish our Commercial Museum as an efficient auxiliary in making our class work of more vital interest. Through the energy of Dr. Brown, thirty different exhibits, illustrative of raw materials and industrial processes, are now upon the shelves of our cases. Considerable illustrative material has also been secured in the form of pictures and lantern slides. Through the addition of this equipment, we are now in a position to add considerably to the value of our courses in Economics.

"The general reorganization of the work of the College, preparatory to entering upon the four-year high school entrance requirement, has necessitated many changes in our prospective work for next year. In making these changes, we have taken care to preserve the division of labor prescribed for the College and State University. With this in mind, the two senior courses described as 'Advanced Economics' have been dropped.

"To meet the demands of the various departments of the College, several new courses have been added for next year. All of these, however, are adaptations of the practical courses formerly given. The material, however, has been re-worked to better adapt it to the needs of the different schools of the College.

"In view of the growing interest in the marketing of Agricultural Products, Cost Accounting, and Farm Efficiency, I would suggest that the President call a conference of those interested, with a view to establishing a Farmers' Business Course, leading to the Bachelor's Degree. This course can very well be followed by graduate courses leading to higher degrees as the demand for such courses arises. In view of the possibility of organizing such a course, I would suggest that we begin immediately to look for a new man who has completed his work for a Doctor's Degree with Agricultural Economics as a specialty.

"There is another point which I desire to emphasize. It is the opportunity of obtaining cheap museum material at the Panama-Pacific Exposition next summer. This is a chance in a lifetime. It appears to me that the State and College should cooperate in obtaining such material as might be desirable for educational purposes. I have included no special item for this purpose in my estimate of expenses, but recommend it to the earnest consideration of all who are interested in building up the illustrative side of our technical educational equipment."

Political Science. Extracts from Doctor Dubach's Report: "The growth of the department is evident. Two hundred students were enrolled each semester; and estimates indicate that three hundred will be enrolled each semester next year. The majority of the departments of the College require National, State, and Municipal Government. This necessitates offering the course in five sections next year. Advanced Commercial Law will be offered in two sections to satisfy the increased demand for the course.

"During the school year 1913-14, the department has been given the full time of a professor for the first time. The head of the department has been assisted by Professor Horner and Mr. Lemon, the former teaching one class one semester, and the latter one class one semester and two classes the other.

"The department desires to add to the present program two elective courses, each three hours for one semester, making one year's work.

"I. Advanced American Government: This course will supplement our present courses in National Government and State and Municipal Government, giving chief attention to the interpretation of our Federal and State constitutions, and the relation of legislation to these constitutions. Court reports will be used liberally with a view to showing the interpretation of the rights of the people guaranteed in our constitutions and the powers granted to the government by these instruments.

"II. Practical Legislation. The work in Advanced American Government would serve as a preparation for this course which will instruct in practical bill drafting. Attention will be given to the correct form, and the correct expressions of the desired content of bills. Emphasis will be placed on the necessity of preparing laws with reference to prior legislation and court decisions. In addition, it is hoped that students will be led to see the necessity of studying conditions, and the possibility of guiding legislation to meet the demands of the times.

"The department regards these courses as absolutely essential to the completion of our program. We are sending students into all walks of life, and counseling them to take an active part in the affairs of State. These people will be called upon to aid in securing legislation along industrial lines. Today the large majority of legislation has an economic bearing, and as never before, agricultural and commercial classes are demanding representation in our legislatures. If these classes that we are sending from this school are to assume their part in such work, they need the advantages of the information of these courses.

"Due to the large number of students and classes, the department has been unable to give much attention to work outside of school. Professor Dubach attended the meeting of the Pacific Coast Branch of the American Political Science Association at Seattle and delivered an address.

He also offered a course on the 'Opportunities of Rural Life' at the Y. M. C. A. conference at Columbia Beach, June 12 to 21.

"The work for next year will continue in the same fields and by the same methods; but, with added assistance, it will be more intensive. Whenever possible, without neglect to immediate school duties, more attention will be given to outside work in the future. Better acquaintance with the State and the people is essential to the best service. Plans are being arranged to give some of our students opportunity to visit the legislature during its next session for first-hand study.

Stenography and Office Training. Extracts from Professor Blanchard's report: "The department of Stenography and Office Training has two purposes in mind; first, to devote its best energies to train students for the positions of stenographer, private secretary, verbatim reporter, and teacher of commercial subjects; second, to be of as much service as practicable to students of all other schools and departments of the College in giving them a general knowledge of efficient office procedure. Earnest endeavor is made to keep before the student the practical side of the coures offered, and to interest him in those organizations that aim to strive for more efficient training in his profession.

"In order to train those of our students who wish to enter the teaching profession, we should be in closer touch with the commercial departments of State high schools. A systematic investigation of these commercial departments should be undertaken, and lectures should be scheduled for high school convocation exercises concerning general commercial education, with special emphasis on the services offered by the School of Commerce here."

ROOM, EQUIPMENT, AND SUPPLIES.

Additional Room. The School of Commerce has for some time ranked second among the departments of the College in respect to the number of students taught annually, and under the new courses it will perhaps rank first in this respect. Its regular enrollment averages one-tenth of the total registration of the College. If the School continues to grow as it has in the last five years, larger quarters will be imperative. At present all the activities of the School are crowded into seven classrooms and two offices. At least three new rooms, and an office for the department of Political Science, will be needed next year.

Equipment. Few schools of commerce are better equipped than ours for effective Business Training. Hence additional equipment required is not extensive. The principal items needed are 33 student desks, to accommodate the students in Farm and Industrial Accounting. At present, we have no locker facilities for these students, and this causes great confusion and considerable loss to the students in material and time. These desks, however, will give drawer room for 165 students, nearly enough to accommodate all who will register in these courses next year. Full office equipment will be needed for the Bureau of Markets. I recommend that we purchase another Edison Dictaphone and an Edison Mimeograph, both of which are essential to proper training in office methods. The growth of the work in typewriting will necessitate either the purchase or the rental of four new machines and desks. Of these two alternatives, I recommend purchase, since the rentals will pay for the machines in three years.

Repairs and Improvements. Under repairs there are needed certain partitions in Room 303 for the purpose of making more efficient the work in Stenography and Office Training. These partitions will be movable, and will in no way interfere with the use of the room for other purposes. There should be several changes in our lighting system, both in the interest of efficiency and economy.

Traveling Expenses. Heretofore, the School of Commerce has never been represented at any of the national conventions of commercial teachers, and no regular appropriation has been made for traveling expenses incurred by instructors who accompany students on inspection trips. Provision should be made for such purposes. There should also be an allowance for occasional lecturers who come to address the students of the School of Commerce.

Supplies. As hitherto, the student fees will be sufficient to meet the cost of class supplies. About $125 a year will be required for office and class room supplies including postage.

The extraordinary importance attached to business training of farmers and all industrial classes appears from the fact that in the Office of Markets and Organizations of the U. S. department of Agriculture, the Division of Marketing Business Practice devotes its entire attention to the establishment of uniform cost accounting, auditing, and office systems for cooperative organizations. There is a similar organization in the Office of Farm Management for the study of uniform farm accounting and business systems. With these facts in mind, we may go ahead with the assurance that we are leading in a great forward movement for the solution of some of the great practical economic problems of our times.

Respectfully submitted,
J. A. BEXELL,
Dean of the School of Commerce.

REPORT OF THE DEPARTMENT OF PHARMACY.

To the President of the College,

Sir: I have the honor to submit to you the report of the department of Pharmacy. I am including certain recommendations in this report which I believe are necessary to the further development of the department.

Since I did not assume the duties of the head of the department of Pharmacy until September 1, 1914, and am therefore unable to give first-hand statistics of the work for the last biennium, I am confining this report to my observations in the department since joining the institution.

RESOURCES AND WORK OF THE DEPARTMENT.

I am pleased to report that I found the department well located on the fourth floor of Science Hall, with ample room to carry on the work for the number of students at present enrolled. In order to make the work more scientifically exact, however, it will be necessary to provide more light; this can only be done by building skylights.

The laboratory desks, although of a very inexpensive type, were well planned, and if provided with the necessary locks would be well fitted to carry on the work.

The stock room, on account of the poor grade of unplaned lumber used as shelving, is in need of remodeling.

The stock, I regret to say, I found in very poor condition, this being due, no doubt, to the breakage and loss incurred when the department of Pharmacy was transferred from the old quarters to the new. During the past few months, however, we have been very fortunate in having our stock replenished, and in a short time we shall be as well equipped for instructional work as the best schools of pharmacy.

Instruction. As we were unable to secure the services of a competent assistant in the teaching work of the department for this year, it became necessary to change the hours of classes so that I could teach all of the subjects in the curriculum but Pharmacognosy. For instruction in this subject, we were very fortunate, through the cooperation of the department of Chemistry, in securing the valuable services of Mr. M. J. Seeley, whose exceptional preparations for teaching this course relieved me of the responsibility of carrying it. The work, since the beginning of the year, has been progressing very satisfactorily.

Courses of Study. Several new courses have been added to the curriculum; these were needed in order better to fit the students for the work they have undertaken. A revision of the courses in Pharmacy is now possible, since ample room and laboratory facilities permit a considerable expansion of the work. An effort will be made to arrange the courses of study so that they will compare favorably with those given at the best schools of Pharmacy. By doing this, it will be possible to exchange credits with the best schools.

In regard to the attendance of the department, it appears that the usual number of students are registered; and it is gratifying to me to note that the majority are registered in the longer course of study. This is the most satisfactory course in the department; and the students, from the standpoint both of scholarship and individual resources, are well prepared to carry on the work. The shorter course in Pharmacy has been arranged primarily for students who are older and who have had considerable experience in drugstore work. Under these conditions, they are able to carry the heavy work in this short course in a satisfactory manner.

NEEDS OF THE DEPARTMENT.

Fire Escapes. I desire to call attention to the need of fire escapes at Science Hall, especially from the fourth floor. Owing to the arrangement of the stairs and stock rooms, it would be almost impossible, should a fire occur, for the students to leave the building by the one exit that is available as the building is now constructed.

Apparatus. On my arrival I noticed the lack of pharmaceutical apparatus which is needed to carry on such analytical work as should be done by a State School of Pharmacy for the residents of the State. It often becomes necessary to investigate samples of unknown remedies for their identity, fitness for use, especially for young children, and for various other reasons. A laboratory of this kind would not only be of great value to the people of the State, but would improve the work of the department.

Drug Garden. The cultivation of drugs has become so universal of late that many drug farms are being started in the most favorable sections of the United States. Nearly all drugs, but more especially those which command high prices, are indigenous to Oregon. Before the cultivation of drugs in this State can be carried on with profit, however, it will be necessary to arrange experimental plots where the proper conditions of cultivation can be studied. A drug garden of this character could be maintained to good advantage at this College because of the facilities for general botanical work.

Instructor. It will be necessary to secure an assistant in Pharmacy for the ensuing year. It is impossible for one instructor to teach all of the subjects with sustained efficiency. I therefore recommend that such an assistant be engaged.

Museum and Illustrative Apparatus. It is customary in all lines of instructional work, but more especially in Pharmacy, to have a museum where special pieces of apparatus, the various types of newer remedies, and entire drug plants can be exhibited. By having available exhibits to which he can refer, the student often gains ideas that would be difficult for him to grasp from mere explanation.

It is impossible to carry in stock all types of drug plants, because many of them are so large that it would be impossible to show them. By use of a projection lantern and a set of slides, however, it is possible to show the characteristics of all drug plants; and this in itself is a most desirable feature of any school of pharmacy.

Respectfully submitted,
ADOLPH ZIEFLE,
Professor of Pharmacy.

REPORT OF THE LIBRARIAN.

To the President of the College,

Sir: I have the honor to submit the following report of the Library for the biennium ending June 30, 1914:

Size of the Library. The library consists of 28,300 volumes, including government documents, together with about 40,000 pamphlets. It subscribes for 422 periodicals and receives about 175 gratis. It has received as gifts 384 volumes, 29 of which were received from the University of Oregon library. These were duplicates of books in the University library, but not included in the College library. The remainder of the gifts were chiefly from the faculty and alumni of the College.

During the past biennium the library again received a State appropriation of $15,000 for books and periodicals. From the Crop Pest appropriation, books and periodicals to the amount of $805.47 have been purchased.

Library Staff. The library staff has consisted of the librarian and four assistants, together with a page working not more than three hours a day.

Service. The regular service consists in the circulation of books, and in reference work for the students and faculty. Until a few months ago the library hours were 8:00 a. m. to 6:00 p. m., with a closed hour for lunch, and from 7:00 to 9:00 p. m. four evenings in the week; however, the demand for service became so great that the open hours have been lengthened by seven a week, making a total of 61 hours a week during the regular school year and 48 hours during the summer.

Growth of the Library. A brief comparison with the report of the preceding biennium shows a most gratifying growth in the usefulness of the library. On June 30, 1912, the library contained 11,405 cataloged volumes; on June 30, 1914, it contained 21,245 volumes, showing an addition for the biennium of 9,840 volumes, an increase of over 96 per cent. With the exception of perhaps 500 volumes of valuable sets of government documents which we have been able to complete during the biennium, the addition is new material.

On June 30, 1912, the library subscribed for 268 periodicals; the subscription at present numbers 422 periodicals, an increase of 75 per cent. The periodicals added are scientific and technical, very few general periodicals having been added.

The circulation of books and periodicals among faculty and students has increased during this biennium 70 per cent over that of the preceding biennium, and it is safe to assume that the reference work has kept pace with the circulation. It would have been impossible, with the present library staff, to care for this increased work, if our students were not taught by practical laboratory problems the use of the library and how to serve themselves. A one-credit course is given all freshmen in the use of reference books, catalogues, indexes, and bibliographies of both books and periodicals.

One feature of the service added during the past biennium has proved very satisfactory; lists of the new books added to the library from time to time, have been sent to the faculty and employees of the College. This has been an important factor in increasing the circulation of books among the faculty.

During the Winter Short Course, lectures were given to the Short Course students on library material helpful to farmers and how it may be secured. There has been a continued demand from different parts of the State, especially from the alumni, for library help and material. The library has been called upon recently for some extension work. Assistance was asked and given in the organization of the Corvallis Public Library, and the librarian was asked to address the Southern State Federation of Women's Clubs on the subject of libraries and children's books.

The work next year will be greatly strengthened through better department organization, made possible by the addition of another trained library assistant; it will be strengthened, also, by the high educational and technical qualification of our library staff for next year. Every member except the stenographer and page will be a college graduate, and of these all except one have had from five to six years university training, and two years special training in university library schools. This educational and technical training gives our staff the efficiency so necessary in a college library, where service must be exact and prompt.

Needs. It is unnecessary to state our need of a library fund at least as great as that of the last biennium. It should be considerably increased. Although our library has grown at a most gratifying rate, it is still far from adequate to meet the needs of a school growing in numbers and quality of work as is our College.

Our greatest need is room in which to house our excellent, rapidly accumulating collection, and to carry on the necessary library operations. Our student body in 1908-09 numbered 1,351, in 1913-14, 2,435; thus, while our student body has nearly doubled, and our number of books and periodicals has increased in proportion, we have not been able to increase our reading room space at all. There were frequent occasions last winter when the seats were all taken, when students were standing about the room, and other students leaving because of the discomforts of such a crowded place.

The statement concerning the additions to our library given above show that while we have nearly doubled the amount of material in the library during the last biennium we have not increased our shelving capacity. It would have been physically impossible as well as unsafe to house this material if we had not secured some relief by piling our least-used government documents on the floor in one of the offices on a lower floor. It is unnecessary to state that the efficiency and economy of service is greatly impaired from the crowded condition which makes it impossible to keep the library material shelved in logical order. Great credit is due our library assistants for the faithful cheerfulness with which they have served under the existing crowded conditions through this stressful period of growth. It speaks well for their self-control and loyalty.

From the point of view of both service and storage, relief in the matter of housing the library has become imperative.

Respectfully submitted,
IDA A. KIDDER,
Librarian.

REPORT OF THE REGISTRAR.

To the President of the College,

Sir: I have the honor to submit, herewith, my report as Registrar of the College. The report covers the two academic years 1912-13, 1913-14. You will note that figures showing the total number of matriculates do not include students enrolled in correspondence work, but only those taking resident work at the College. In addition to the totals listed below, about fifty persons took advantage of the free correspondence course offered by the School of Commerce. These comprised farmers, semi-professional men, merchants, and clerks, men whose ages ranged from nineteen to forty-seven years.

In comparing the enrollment for the biennial period by schools and departments, we notice a substantial increase in the total number of students for the degree courses of Agriculture, Domestic Science and Art, Commerce, and Pharmacy.

Table I. Comparative Statement Showing Classification as to Courses.
(All duplicates excluded.)

	36 Weeks courses		Winter courses		Total	
Departments	1912-13	1913-14	1912-13	1913-14	1912-13	1913-14
Agriculture	429	496	621	521	1050	1017
Forestry	51	81	3	*	54	81
Domestic Science and Art	270	326	201	126	471	452
Engineering and Industrial Arts	299	302	12	3	311	305
Pharmacy	51	69	*	*	51	69
Commerce	143	160	15	19	158	179
Optional	59	86	*	*	59	86
Music Only	62	59	*	*	62	59
Summer School					98	187
Totals	1364	1579	852	669	2314	2435

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*No courses offered.

With the ratio of men to women in the student body remaining practically constant during the biennium, (70 per cent men and 30 per cent women), there is a steady, though in the aggregate not rapid, increase in the number of women registering in the technical courses, other than Domestic Science and Art. Such departments, showing an increase in the number of women registered, are Agriculture, Commerce, and Pharmacy. The percentage of increase of women registering in these departments is thirteen per cent, while the increase in the Domestic Science department for the same period was approximately twenty-one per cent.

Table II. Matriculates Classified as to Sex and Departments.

	1912-13			1913-14		
Departments	Men	Women	Total	Men	Women	Total
Agriculture	424	5	429	490	6	496
Forestry	51	....	51	81	....	81
Domestic Science and Art	......	270	270	......	326	326
Engineering and Industrial Arts	299	......	299	302	......	302
Commerce	101	42	143	113	47	160
Pharmacy	44	7	51	61	8	69
Optional	14	45	59	20	66	86
Summer School	20	78	98	69	118	187
Music	15	47	62	19	40	59
Winter Short Course	645	207	852	494	175	669
Totals	1613	701	2314	1649	786	2435

Table III. Distribution of Students by Collegiate Rank or Year.

Classification	1912-13	1913-14
Graduates	27	18
Seniors	107	172
Juniors	176	227
Sophomores	215	267
Freshmen	476	532
Optional	59	86
Special	65	78
Secondary	177	140
Music	62	59
Winter Short Courses	852	669
Summer Session	98	187
Totals	2314	2435

Table IV indicates a notable advance in the average age of secondary students entering in 1913-14 as compared with those entering in 1912-13. This age, 19 years, is nearly a year in advance of the average age of students graduating from State high schools.

Table IV. Average Age of Regular Students.

	1912-13	1913-14
Secondary students	18.2	19
College students (including special and optional)	19.7	20.1
Senior class	22.5	22.4

A number of interesting facts appear from the study of Table V showing the geographical distribution of students. First of all is the fact that for each of the two years of the biennium, every county in the State was represented at the College by three or more students in residence. For each of the two years, two counties, Multnomah and Benton, sent more than two hundred students each, and in 1912-13 Linn sent one hundred seven, with ninety-nine for the following year. The second year of the biennium is representative of the general distribution of students throughout the State; and for that period nine counties sent fifty or more students, ten others sent not less than twenty each, and only eight counties of the State were represented by less than ten students, with three as a minimum, the latter coming from a county with only one and one-fourth persons to the square mile.

Each year of the biennium shows representatives registered at the College from states which form an unbroken chain from the Atlantic to the Pacific, and, in addition to these states, twelve foreign countries were represented by matriculates. Totals of Table V indicate that for the year 1912-13, approximately one student in seven registered from some state other than Oregon, while in 1913-14 the ratio was approximately one in six. Details of the geographical distribution are as follows:

Table V. Distribution of Students by Residence.

(All duplicated excluded.)

	36 Weeks courses		Short courses		Total	
Oregon counties	1912-13	1913-14	1912-13	1913-14	1912-13	1913-14
Baker	8	17	1	5	9	22
Benton	264	306	466	387	730	693
Clackamas	33	39	19	16	52	55
Clatsop	31	25	13	2	44	27
Columbia	7	12	3	6	10	18
Coos	17	20	8	4	25	24
Crook	12	11	6	5	18	16
Curry	4	2	6	3	10	5
Douglas	27	34	16	22	43	56
Gilliam	6	6	2	1	8	7
Grant	1	2	2	1	3	3
Harney	11	7	3	2	14	9
Hood River	21	29	34	26	55	55
Jackson	32	28	14	13	46	41
Josephine	13	14	3	8	16	22
Klamath	5	9	4	5	9	14
Lake	7	6	4	3	11	9
Lane	42	40	10	34	52	74
Lincoln	19	6	11	11	30	17
Linn	50	50	57	49	107	99
Malheur	5	8	1	....	6	8
Marion	62	59	28	37	90	96
Morrow	4	9	....	3	4	12
Multnomah	214	253	54	52	268	305
Polk	25	29	25	18	50	47
Sherman	11	13	1	4	12	17
Tillamook	3	5	....	3	3	8
Umatilla	31	34	7	12	38	46
Union	27	36	6	2	33	38
Wallowa	20	16	1	3	21	19
Wasco	13	20	7	6	20	26
Washington	27	26	25	23	52	49
Wheeler	3	7	1	....	4	7
Yamhill	36	49	29	25	65	74
	1091	1227	867	791	1958	2018

	36 Weeks courses		Short courses		Total	
Foreign countries	1912-13	1913-14	1912-13	1913-14	1912-13	1913-14
Armenia	1				1	
Canada	8	10	8	7	16	17
China	5	3	..	..	5	3
Hawaii	4	6	1	..	5	6
Greece	..	1	..	..	..	1
India	6	6	..	..	6	6
Ireland	1	..	1	..	2	..
Japan	5	4	..	..	5	4
Mexico	2	..	1	..	3	..
Philippine Is.	..	1	..	..	..	1
Poland	1	..	..	..	1	..
Russia	1	2	..	..	1	2
Totals	34	33	11	7	45	40

DISTRIBUTION BY RESIDENCE—Continued

States and territories	36 Weeks courses 1912-13	36 Weeks courses 1913-14	Short courses 1912-13	Short courses 1913-14	Total 1912-13	Total 1913-14
Alabama	1				1	
Alaska	3	6	2	1	5	7
Arizona	1		1		2	
California	70	102	11	9	81	111
Colorado	1	2	1		1	2
Connecticut	1	..	..	1	1	1
Delaware	3	1	..	..	3	1
Dist. of Columbia	1	..	..	..	1	......
Florida	..	1	..	..	..	1
Idaho	22	29	5	3	27	32
Illinois	5	14	4	4	9	18
Indiana	2	6	..	1	2	7
Iowa	3	3	1	1	4	4
Kansas	2	8	..	..	2	8
Kentucky	3	3	..	..	3	3
Louisiana	1	..	..	..	1	..
Maine	..	..	1	1	1	1
Massachusetts	6	7	..	..	6	7
Michigan	2	4	1	..	3	4
Minnesota	3	5	1	2	4	7
Missouri	1	2	..	1	1	3
Montana	1	5	1	..	1	5
Nebraska	3	3	..	..	3	3
New Hampshire	1	1	..	..	1	1
New Jersey	3	1	..	..	3	1
New Mexico	2	1	..	..	2	1
New York	10	12	6	1	16	13
North Carolina	1	..	..	..	1	..
North Dakota	1	..	..	1	1	1
Ohio	3	6	..	..	3	6
Oklahoma	6	2	..	..	6	2
Pennsylvania	2	3	..	1	2	4
Rhode Island	..	1	..	..	..	1
South Dakota	2	1	..	1	2	2
Texas	..	1	2	..	2	1
Utah	1	1	..	..	1	1
Vermont	1	..	1	..	2	..
Washington	69	82	35	29	104	111
Wisconsin	1	3	..	1	1	4
Wyoming	1	2	..	..	1	2
	239	319	72	58	311	377
Oregon Counties	1091	1227	867	791	1958	2018
States and Territories	239	319	72	58	311	377
Foreign Countries	34	33	11	7	45	40
Grand Total	1364	1579	950	856	2314	2435

Table VI shows the scholarship qualifications of students at their entrance to College in 1913-14 as compared with 1912-13. It will be noted that there was a gain of practically 37 per cent in the number of intrants with the full four years of high school credit in 1913-14 as compared with 1912-13.

Table VI. Comparative Statement of the Educational Standing of Intrants Before Registering at the College.

	1912-13 No. of Intrants	1912-13 Percent of Intrants	1913-14 No. of Intrants	1913-14 Percent of Intrants
Entered on examination	3	.48	2	.30
Eighth grade graduates	104	16.67	67	10.00
Ninth grade graduates	58	9.30	43	6.41
Tenth grade graduates	123	19.71	116	17.30
Eleventh grade graduates	51	8.01	66	9.85
Twelfth grade graduates	221	35.41	303	45.22
Transfers from Colleges and Universities	64	10.26	73	10.90
	624		670	

During the biennium 1912-14 the College offered baccalaureate degrees in nine different schools and departments; namely, Agriculture, Forestry, Domestic Science and Art, Civil Engineering, Electrical Engineering, Mechanical Engineering, Mining Engineeering, Commerce, and Pharmacy. The tenth department, that of Industrial Arts, was added to the degree courses for the first time in 1913-14. Within the nine schools and departments, major courses were offered in twenty-one distinct lines of work. During the past few years there has been a steadily growing demand for graduate work, not only from our own alumni, but from students coming from other institutions with the degree of bachelor of science. The steady growth of the graduating class during recent years is shown by the fact that the class of June, 1914, was two hundred and sixty per cent larger than the last class graduating prior to the present administration, (that is, the class of June, 1907).

Table VII. Degrees Conferred and Certificates Granted.

	1912-13			1913-14		
	Men	Women	Total	Men	Women	Total
Master of Science in Agriculture	2		2	3		3
Bachelor of Science in						
Agriculture	35		35	55	2	57
Forestry	2		2	6		6
Domestic Science and Art		21	21		46	46
Engineering	24		24	35		35
Commerce	9	3	12	10	2	12
Pharmacy	3		3	2	2	4
Total Degrees	75	24	99	108	52	163
Certificate in Two-Year Pharmacy Course		2	2	3		3
Diploma in Music		3	3		6	6
Grand Totals	75	29	104	114	58	172

Table VIII. Colleges, Universities, and Normal Schools from Which Members of the Graduating Classes for the Past Two Years Transferred to the Oregon Agricultural College.

UNIVERSITIES AND COLLEGES	1913	1914
University of Minnesota	2	..
University of Maine	1	..
University of Wisconsin	1	..
University of Oregon	3	1
University of Missouri	2	..
University of California	1	3
University of New Mexico	..	1
University of Puget Sound (Washington*)	..	1
University of Idaho	..	1
University of Illinois	..	2
University of Washington	..	1
University of No. Dakota	..	1
University of Kansas	..	1
Ohio State University	1	..
Stanford University	1	..
Cornell University (N. Y.)	..	2
Willamette University	..	2
Wesleyan University (Ohio)	..	1
Iowa State Agricultural College	3	1
Michigan Agricultural College	2	..
Washington State College	3	3

Kansas Agricultural College	2		1	
Oklahoma Agricultural College	2		..	
Occidental College (California)	1		3	
Wittenberg College (Ohio)	..		1	
Oberlin College (Ohio)	..		1	
Iowa Wesleyan	..		1	
California Polytechnic	..		1	
Grenville College (Illinois)	1		..	
Connecticut Agricultural College	..		1	
Howard Payne College (Mo.)	..		1	
Albany College	..		1	
Berea College (Ky.)	..		1	
Hiram College (Ohio)	..		1	
Dallas College	..		1	
Colorado School of Mines	..		1	
College of Ind. Arts (Texas)	..		1	
Highland Park College (Iowa)	..		1	
Ontario Agricultural College	..		1	
Kurnamoto Agricultural School (Japan)	1	27	..	39
NORMAL SCHOOLS				
Bellingham Normal (Washington)	1		..	
California State Normal	..		1	
Eastern Oregon State Normal	..		1	
Oregon State Normal	3	4	..	2
		31		41

Table IX. Graduates, 1913.

AGRICULTURE

Roy Alspaugh, Estacada, Clackamas
Leo Bernstein, Portland, Multnomah
Ralph Abel Blanchard, Chicago, Illinois
Charles Stockton Brewster, Minneapolis, Minnesota
Homer Maxwell Carnes, North Powder, Union
Earl Charles Chandler, Sheridan, Yamhill
Arthus Chase, Corvallis, Benton
Benjamin Harrison Cooper, Corvallis, Benton
John E. Cooter, Cottage Grove, Lane
Ernest Walton Curtis, Claremont, California
William Henry Dunham, Portland, Multnomah
Jesse Boyd Edington, Athena, Umatilla
Blaine Ferguson, Hailey, Idaho
Jesse Ray Fleming, Shaniko, Wasco
James Clarence Gibbs, Grace, Idaho
Harold Roland Glaisyer, Forest Grove, Washington
Frank Harrington, Creswell, Lane
Leonard Ramsden Hartill, Brooklyn, New York
Harry Clayton Hetzel, Madison, Wisconsin
D. Brooks Hogan, Lebanon, Linn
Donald Kellogg, Hoquiam, Washington State
Glenn Kelly, Portland, Multnomah
Lawrence McBride, Eddyville, Lincoln
Cecil Paul Moffitt, Junction City, Lane
G. Millage Montgomery, Alhambra, California
Kakuji Okamoto, Kumamoto-Ken, Japan
Earl Nathaniel Pearcy, Portland, Multnomah
Louis Sawyer, Salem, Marion
Obil Shattuck, Klamath Falls, Klamath
Frederick Lawrence Strang, Medford, Jackson
Royal Burleigh Thompson, Corvallis, Benton
Gordon Keller VanGundia, Sycamore, Ohio
Edward Jasper Weber, Creswell, Lane
James Harold Wilson, Gresham, Multnomah
Myron McCord Winslow, Okmulgee, Oklahoma

FORESTRY

Walt LeRoy Dutton, Lakeview, Lake
Harold Sale Turley, Astoria, Clatsop

DOMESTIC SCIENCE AND ART

Elizabeth May Buchanan, Corvallis, Benton
Alice Marie Cathey, Corvallis, Benton
Helen Julia Cowgill, Corvallis, Benton
Lucy Adella Crawford, Ashland, Jackson
Mrs. Annie Cusick, Medford, Jackson
Adella Davenport, Corvallis, Benton
R. June Gray, Eugene, Lane
Mary Elizabeth Hartung, Eugene, Lane
Clara Hartzog, Lakeview, Lake
Grace Hobbs, Eugene, Lane

Annie Marie Johnson, Albany, Linn
Dorothy Keatley, Castle Rock, Washington State
Emily Marie Miller, Corvallis, Benton
Margaret Chadsey Morehouse, Eugene, Lane
Margaret Mead Osburn, Newport, Lincoln
Delia Jeanetta Purves, Seattle, Washington State
Amber Bessie Spaulding, Albany, Linn
Dorathea Steusloff, Salem, Marion
Emma Matilda Ueland, Roseburg, Douglas
Henrietta Walker, Cleveland, Douglas
Opal Wasser, Corvallis, Benton

CIVIL ENGINEERING

Charles McFerrin Hartsock, Albany, Linn
G. Clay Jones, Corvallis, Benton
Benjamin Henry McNamee, Portland, Multnomah
Eugene Herman Scovil, Grants Pass, Josephine
Francis Willard Smith, Portland, Multnomah
Harry Mark Teel, Echo, Umatilla
William Henry Whiteley, Corvallis, Benton

ELECTRICAL ENGINEERING

Roy Julius Anderson, Tillamook, Tillamook
Leeser Solis Cohen, Portland, Multnomah
Guy Cronemiller, Lakeview, Lake
Yoshitaro Fujihira, Wakayama, Japan
Leonard Humphrey Kistler, Portland, Multnomah
Robert McKenzie, Lostine, Wallowa
George R. Milner, Okmulgee, Oklahoma
George Willis Morris, Corvallis, Benton
Lance Read, Portland, Multnomah
Homer Harrison Shake, Payette, Idaho
Odith Spurrier, Guthrie, Oklahoma
Lester Tycer, Brownsville, Linn

MECHANICAL ENGINEERING

Frederick Carl Jernstedt, Carlton, Yamhill
Leo Edvin Johnson, Carlton, Yamhill

MINING ENGINEERING

Carl Nathaniel Anderson, Portland, Multnomah
Rowley Cruit, Liverpool, England
S. Whitley Richardson, Salem, Marion

COMMERCE

R. Walton Brown, Drewsey, Harney
Malich Earl Canfield, Albany, Linn
Frank Azem Keefover, Salem, Marion
LeRoy Roderick McKenzie, Summerville, Union
Virginia Rhomeyn Mescher, Silverton, Marion
Erwin Montague, Arlington, Gilliam
Edgar Turner Pierce, Harrisburg, Linn
Lester Porter, Corvallis, Benton
Grace Eugene Wallace, Independence, Polk
Gertrude LaVern Walling. Salem, Marion
Arthur James Wilson, Albany, Linn
Willis Webster Winslow, Okmulgee, Oklahoma

PHARMACY

Thomas Hawkins, Toledo, Lincoln
Desire Joseph Perard, Toppenish, Washington State
Charles Henry Reynolds, La Grande, Union

MASTER OF SCIENCE IN AGRICULTURE

Godfrey Vernon Copson, Grand Rapids, Michigan
Harley Frost Wilson, Corvallis, Benton

DIPLOMA SCHOOL OF MUSIC

Florence Irene Boco, Corvallis, Benton
Sylvia Alice Oakes, Gaston, Washington
Maud Josephine Turlay, Astoria, Clatsop

CERTIFICATE PHARMACY SHORT COURSE

Vida Chrisman, Silver Lake, Lake
Opal Viola Daley, Medford, Jackson

Table X. Graduates, 1914.

AGRICULTURE

Leonard John Allen, Cove, Union
Louis Frederic Anderson, Pendleton, Umatilla
Ralph Waldo Arens, Hood River, Hood River
James Charles Bonner, Corvallis, Benton
Joe Miles Boothe, Union, Union
Mortimer Parker Cook, Portland, Multnomah
Sumner John Damon, Ferndale, California
Connor Whealdon Edwards, Monroe, Benton
Kate Whittlesey Failing, Portland, Multnomah
Harold Darwin Foster, Seattle, Washington State
Hosmer Cullen Gambee, Portland, Multnomah
Louis Phaon Gambee, Portland, Multnomah
Joseph Hunter Gooding, Wilmington, Delaware
Charles Lester Hill, Berea, Kentucky
Melvin Rutherford Hoff, New Era, Clackamas
Walter Leo Horobin, Cornwall-on-Hudson, New York
D. C. Howard, Corvallis, Benton
Walter William Howard, Corvallis, Benton
Jesse Brooke Hukill, Corvallis, Benton
Neal Clement Jamison, Corvallis, Benton
George Raymond Johnson, Cooston, Coos
Frank Walter Kehrli, Hillsdale, Multnomah
Oliver Frank Kilham, Beverly, Massachusetts
William King, Eugene, Lane
Andrew Cameron McCormick, Lebanon, Linn
John Robert Magness, Amity, Yamhill
John Holmes Martin, Corvallis, Benton
Albert Freeman Mason, Pasadena, California
John Frederick Morse, San Francisco, California
George Franklin Moznette, Vancouver, Washington State
Ray Albert Needham, Tracy, California
Francis Edwards Neer, Pasadena, California
Raymond Edward Nicholson, Hood River, Hood River
Clara Manerva Nixon, Trumansburg, New York
Aaron Lemuel Olmsted, Enterprise, Wallowa
Henry Irving Padgham, Santa Ana, California
Emmet Nathan Palmer, Central Point, Jackson
Charles Leon Robinson, Forest Grove, Washington
Ralph Merrill Rutledge, Corvallis, Benton
George Friedrich Sanders, The Dalles, Wasco
Henry Isaacs Savage, Corvallis, Benton
Harry August Schoth, Oregon City, Clackamas
Fred William Schreiber, McMinnville, Yamhill
Carl Ephraim Schuster, Corvallis, Benton
Joy William Scudder, Seattle, Washington State
Robert Ervin Shinn, Salem, Marion
Herbert William Siefert, Pasadena, California
William Anderson Smart, Santa Ana, California
Charles Allison Starker, Portland, Multnomah
Oscar Brent Stauff, Cooston, Coos
Victor Hugo Stauff, Cooston, Coos
Hans Struve, Pendleton, Umatilla
Leif Erikson Wahlberg, San Francisco, California
Byron Bentley Walker, Nova Scotia
Harry Sidney Walters, Cove, Union
Estey Walton, Sanger, California
Chester Manning Wilcox, Portland, Multnomah

FORESTRY

Lynn Foster Cronemiller, Lakeview, Lake
Lee Earl Emery, Corvallis, Benton
James Camston Evenden, Warrenton, Clatsop
Paul Freydig, Sutherlin, Douglas
Marshall Crane Hayes, Pasadena, California
Carl Nelson Miller, Indianapolis, Indiana

DOMESTIC SCIENCE AND ART

Etta Adamas, Corvallis, Benton
Edith May Allworth, Crawford, Washington State
Leona Crawford Atherton, Heppner, Morrow
Viva Delle Archibald, Albany, Linn
Ursula Amelia Becke, Aurora, Marion
Norma Gladys Bick, Philomath, Benton
Bertha Mildred Booth, Portland, Multnomah
Elva Merle Bowen, Silverton, Marion
Edythe Matlida Brunquist, Hood River, Hood River
Alice Emma Butler, Mapleton, Iowa
Jennie Emma Cadwell, Berkeley, California

Anabelle Trustlo Callison, Aberdeen, Washington State
Hazel Cartan, Corvallis, Benton
Maribel Whitman Cheney, Coupeville, Washington State
Grace May Dinges, Corvallis, Benton
Cordelia Hawley Goffe, Medford, Jackson
Jettie Marie Hanson, Corvallis, Benton
Esther Jennie Hartung, Eugene, Lane
Marie Anette Hofer, Salem, Marion
Hazel Holt, Corvallis, Benton
Virginia Keatley, Castle Rock, Washington State
Anna Marian Keller, Portland, Multnomah
Kathreen Lea Kirkpatrick, Pendleton, Umatilla
Mayme Elizabeth Lance, Corvallis, Benton
Elizabeth Thurman Lewis, Pacific Grove, California
Hazel Adelia McKee, Lakeview, Lake
Lottie Faye Mentzer, Pendleton, Umatilla
Ethel May Metzler, Corvallis, Benton
Lottie Milam, Macon, Missouri
Helen Loraine Miller, Portland, Multnomah
Christine Orford, DeLamar, Idaho
Nola Payne, Woodburn, Marion
Gladys Aileen Robey, Corvallis, Benton
Clista Al Wilda Solomon, Salem, Marion
Edyth Golda Shaw, Salem, Marion
Winnie Catherine Shields, Milton, Umatilla
Esther Ruby Smith, Corvallis, Benton
Evelyn Dumaresq Spencer, Portland, Multnomah
Mylius Lysle Summers, Fresno, California
Georgia Lois Swafford, San Luis Obispo, California
Lillian Thordarson, Corvallis, Benton
Sarah Bledsoe Vineyard, Boise, Idaho
Flora Whiteley, Victoria, British Columbia
Lois Katherine Wilson, Salem, Marion
Mildred Marie Wilson, Salem, Marion
Marian Drusilla Young, Coquille, Coos

CIVIL ENGINEERING

Alan Kendall Andrews, Medford, Jackson
Walter Burton Edward Anthony, Carmel, California
Huron Willoughby Clough, Canyonville, Douglas
Ben Eddy, Roseburg, Douglas
Frank Fiedler, Bellingham, Washington State
Benjamin Barton Irving, Corvallis, Benton
Edward Benjamin Loken, Harrisburg, Linn
William Tracy Moore, Oak Grove, Clackamas
Henry Odeen, Portland, Multnomah
Peter Melvin Rinearson, Milwaukee, Clackamas
John Irving Roberts, Sandy, Clackamas
Dexter Ralph Smith, St. Johns, Multnomah

ELECTRICAL ENGINEERING

John Walter Asplund, Marshfield, Coos
Harold Sidney Babb, Campbell, California
Vernon Granding Corkins, Enterprise, Wallowa
Will Herman Foster, Corvallis, Benton
Arnold Ernest Kuhnhausen, Portland, Multnomah
Alfred Oscar Mangold, Portland, Multnomah
Victor Eugene Weber, Brownsville, Linn

MECHANICAL ENGINEERING

Mylo Bartu, Crabtree, Linn
Claud Carthel Baynard, Aumsville, Marion
Ray Boals, Dallas, Polk
Spencer Albert Covell, Corvallis, Benton
Robert Ray Davis Hillsboro, Washington
Ray Roy Hamersley, Corvallis, Benton
Earl Logan Harry, Corvallis, Benton
Lester Thomas Hutt, Yamhill, Yamhill
Fred Merle Miller, Albany, Linn
Carl Emil Niederer, Summerville, Union
Virgil Arthur Rawson, The Dalles, Wasco
Orvill Greenleaf Reeves, Pendleton, Umatilla
Gilbert Thayer, Portland, Multnomah

MINING ENGINEERING

Charles Lloyd Chapman, Sheridan, Yamhill
Ethelbert Dowden, Plainview, Texas
Thomas Alfred Rice, Portland, Multnomah

COMMERCE

Chester Allen Dickey, Wallowa, Clackamas
Sylvan Durkheimer, Portland, Multnomah
Delmar Eddy, Kings Valley, Benton
Ruth Blanche Hawley, Corvallis, Benton
Emil Edwin Horning, Corvallis, Benton
Russel Marion Howard, Corvallis, Benton
Hattie Joy Mason, Hood River, Hood River
Thomas Everett May, Portland, Multnomah
James Emmett Norton, Airlie, Polk
Gordon Rasmussen, Marshfield, Coos
John Richard Williams, Portland, Multnomah
Milton Edwin Woodcock, Corvallis, Benton

PHARMACY

Gaylord Gerald Godfrey, Oregon City, Clackamas
Olive Marv Harry, Corvallis, Benton
Benjiman Horning, Otter Rocks, Lincoln
Rose Coffman Mason, Jefferson, Marion

MASTER OF SCIENCE IN AGRICULTURE

Alden Forrest Barss, Rochester, New York
Glancy Sherman Ralston, Paradise, California
Warren Porter Tufts, Berkeley, California

DIPLOMA SCHOOL OF MUSIC

Janet Ann Blackledge, Corvallis, Benton
Sophia Marie Holboke, Portland, Multnomah
Mary Palmer Morgan, Corvallis, Benton
Elma Opa Rogers, Corvallis, Benton
Ruth Luella Rondeau, Corvallis, Benton
Lena Belle Tartar, Corvallis, Benton

CERTIFICATE PHARMACY SHORT COURSE

Harold Helmuth Albers, Shoshone, Idaho
George Washington Davis, Silverton, Marion
Thomas Laird, Bandon, Coos

Respectfully submitted,
H. M. TENNANT,
Registrar.

REPORT OF THE TREASURER.

To the Honorable President and Board of Regents of the Oregon Agricultural College,

Gentlemen: Herewith my report covering all Federal, State, and County appropriations for Maintenance, Buildings, Equipment, Improvement, Repairs, Library, Experiment, Educational Extension, and other scientific and educational purposes.

Because of the limited time between December 31 and the session of the legislature, it is impracticable to bring all reports up to the close of the calendar year; hence I have shown all Maintenance and Special appropriations up to June 30, 1914; Experiment Stations and Educational Extension up to September 30, 1914, and County Extension appropriations up to December 10, 1914.

Respectfully submitted,
B. F. IRVINE,
Treasurer.

I—RESIDENT INSTRUCTION.

Table I.—Receipts and Disbursements.

Fiscal year ending June 30, 1913.

	Balance July 1, 1912	Receipts	Available	Disbursements	Balance June 30, 1913
RECEIPTS					
State Appropriation	$ 4,830.29	$175.000.00	$179,830.29	$170,557.64	$9,272.65
Federal Appropriation					
Morrill		50,000.00	50,000.00	50,000.00	
Land-Grant Interest	1,624.69	12,649.49	14,254.18	14,254.18	
College Miscellaneous	26,408.74				
Fees		22,909.51			
Rents—Dormitories		3,000.00			
Sales, etc.		5,574.56	57,892.81	54,312.26	3,580.55
Total	$32,863.72	$269,133.56	$301,977.28	$289,124.08	$12,853.20
Available Receipts			$301,977.28		
DISBURSEMENTS					
Salaries	$174,309.33				
Labor	15,346.64				
Office Supplies	7,299.75				
Class Supplies	11,251.91				
Traveling Expense	2,787.83				
Heating	11,454.81				
Light and Power	3,151.19				
Water	1,004.17				
Telegraph and Telephone	933.96				
Publications and Printing	8,697.51				
Advertising	2,620.91				
Miscellaneous Supplies	3,663.60				
Lands	21,897.13				
Improvement	13,847.48				
Repairs	858.86				
Equipment	9,999.00				
Total disbursements			$289,124.08		
Balance June 30, 1913					$12,853.20

Table II.—Receipts and Disbursements.

Fiscal year ending June 30, 1914.

RECEIPTS	July 1, 1913 Balance	Receipts	Available	Disbursements	Balance June 30, 1914
State Appropriation	$ 9,272.65	$300,000.00*	$309,272.65	$231,521.57	$77,751.08
Land-Grant Interest		13,041.56	13,041.56	9,986.97	3,054.59
Morrill		50,000.00	50,000.00	50,000.00	
College Miscellaneous	3,580.55				
Fees		27,890.90	43,216.29	29,970.66	13,245.63
Rents		3,445.00			
Sales, etc.		8,299.84			
Total	$12,853.20	$402,677.30	$415,530.50	$321,479.20	$94,051.30
Available Receipts			$415,530.50		
DISBURSEMENTS					
Salaries	$210,123.52				
Labor	21,470.18				
Office Supplies	1,843.34				
Class Supplies	12,573.21				
Traveling Expense	4,185.23				
Heating	8,124.73				
Light and Power	3,182.29				
Water	1,107.73				
Telephone and Telegraph	1,069.07				
Publications and Printing	9,139.28				
Advertising	3,409.20				
Miscellaneous	9,240.11				
Feeding Stuffs	2,915.29				
Freight and Express	1,666.53				
Buildings	7,345.04				
Land Purchased	3,581.00				
Rentals (Y.M.C.A.)	400.00				
Improvement	13,368.42				
Repairs	122.16				
Equipment	826.66				
Live Stock	5,786.21				
Total Disbursements			$321,479.20		
Balance June 30, 1914					
Maintenance	77,751.08				
L.-G. Interest	3,054.59				
College Miscl.	13,245.63			$ 94,051.30	
Unpaid obligations estimated at				30,297.30	
Balance Available					$63,754.00

*State appropriation for last half of 1913, $100,000.00; 1914, $200,000.00

Table III.—Special Appropriations, Receipts, and Disbursements.

From June 1, 1911, to June 30, 1914.

SPECIAL APPROPRIATIONS (1911)	Receipts	Expenditures	Balance June 30, 1913
BUILDINGS			
Horticulture	$ 36,600.00	$ 44,027.46	$ 7,427.46*
Armory	6,000.00	5,756.31	243.69
Dairy	29,700.00	29,127.21	572.79
Farm Mechanics	14,600.00	14,636.68	36,68*
Foundry	11,000.00	9,898.80	1,101.20
Stock Judging	7,600.00	5,595.04	2,004.96
Mining	28,000.00	24,458.50	3,541.50
Total Buildings	$133.500.00	$133.500.00	
EQUIPMENT	60,000.00	60,000.00	
LIBRARY	15,000.00	15,000.00	
IMPROVEMENT AND REPAIRS	40,000.00	40,000.00	
LAND	25,000.00	25,000.00	
GRAND TOTAL	$273,500.00	$273,500.00	

Note.—1911 appropriations shown for the reason that unexpended balances were shown in the last report. *Deficit.

SPECIAL APPROPRIATIONS (1913)	Receipts	Expenditures	Balance
NEW BUILDINGS			
New Gymnasium, Domestic Science and Art Building, Storage Building, and Stock Barn	$107,000.00	$106,580.10	$ 419.90
IMPROVEMENTS AND REPAIRS, HEATING EXTENSION, and REMODELING SCIENCE HALL	67,000.00	66,981.66	18.34
EQUIPMENT	60,000.00	53,361.65	6,638.35
BOOKS, MAGAZINES AND PERIODICALS	15,000.00	5,657.10	9,342.90
TOTAL	$249,000.00	$232,580.51	$16,419.49

II—AGRICULTURAL EXPERIMENT STATION.

Table IV.—Receipts and Disbursements.

For fiscal year ending June 30, 1913.

Federal Appropriations	Balance July 1, 1912	Receipts	Available	Disbursements	Balance June 30, 1914
HATCH		$15,000.00	$15,000.00	$15,000.00	
ADAMS		15,000.00	15,000.00	15,000.00	
Miscellaneous SALES	50.24	9,557.71	9,607.95	9,607.83	$ .12
Total	50.24	$39.557.71	$39,607.95	$39,607.83	$ .12

CLASSIFIED DISBURSEMENTS	Hatch	Adams	Miscellaneous
Salaries	$ 9,212.03	$11,618.35	$ 4,596.97
Labor	3,019.82	791.34	1,008.44
Publications	43.20		17.65
Postage and Stationery	96.30	1.80	200.30
Freight and Express	29.53	77.21	249.75
Heat, Light, Water	37.65	104.87	8.00
Chemical Supplies	187.99	762.22	43.81
Seeds, Plants, Sundry Supplies	582.61	227.18	241.07
Fertilizer	15.15		
Feeding Stuffs	1,196.00	80.65	2,230.39
Tools, Machinery	229.70	22.85	110.10
Furniture and Fixtures	5.72	53.50	2.00
Scientific Apparatus	99.29	545.13	54.72
Live Stock	52.75	3.40	274.90
Traveling Expense		261.50	57.10
Buildings and Land	192.26	450.00	63.10
Contingent Expense			449.53
Total Disbursements	$15,000.00	$15,000.00	$ 9,607.83
Balance June 30, 1913			.12

Table V.—Receipts and Disbursements.

For fiscal year ending June 30, 1914.

Federal Appropriations	Balance July 1, 1912	Receipts	Available	Disbursements	Balance June 30, 1914
HATCH		$15,000.00	$15,000.00	$15,000.00	
ADAMS		15,000.00	15,000.00	15,000.00	
Miscellaneous SALES	.12	7,653.18	7,653.30	8,038.17	**$384.87***
Total	.12	$37,653.18	$37,653.30	$38,038,17	**$384.87***

CLASSIFIED DISBURSEMENTS	Hatch	Adams	Miscellaneous
Salaries	$10,580.67	$11,099.88	$ 3,288.24
Labor	1,371.59	1,104.92	1,895.15
Postage and Stationery	194.85	13.45	11.45
Freight and Express	52.75	128.98	13.23
Heat, Light, Water	39.96	37.52	
Chemical Supplies	277.49	656.26	
Seeds, Plants, Sundry Supplies	105.97	283.45	270.68
Fertilizer	8.12		
Feeding Stuffs	1,760.63	80.00	1,179.05
Tools, Implements, Machinery	20.70	59.47	
Furniture and Fixtures	52.13	40.83	
Scientific Apparatus	283.24	885.78	
Live Stock	199.75		80.50
Traveling Expense	52.15	202.85	3.65

Library		5.17	2.00
Buildings and Lands		400.74	947.39
Equipment			346.83
Contingent Expense		.70	
Total Disbursements	$15,000.00	$15,000.00	$ 8,038.17
Balance—Deficit—June 30, 1914			384.87*

*This amount was taken care of immediately after July 1.

Table VI.—Receipts and Disbursements for Year Ending December 31, 1912.

(Not submitted in 1912 report.)

	Crop Pest	Scientific Investigation
Balance January 1, 1912	$ 7,192.19	$ 3,844.12
State Appropriation	15,000.00	10,000.00
Total Available	$22,192.19	$13,844.12
DISBURSEMENTS		
Salaries	$12,126.84	$ 7,844.66
Labor	912.00	674.46
Publications	999.19	5.81
Postage and Stationery	110.26	92.99
Freight and Express	99.72	43.47
Heat, Light, Water	39.36	113.47
Chemical Supplies	125.13	2.65
Sundry Supplies	1,174.04	557.59
Fertilizer	.85	15.45
Feeding Stuffs		1,613.35
Library	1,501.53	34.00
Tools, Machinery	131.60	655.56
Furniture and Fixtures	151.06	26.50
Scientific Apparatus	240.27	94.65
Live Stock		1,495.17
Traveling Expense	1,008.73	30.20
Contingent Expense		6.50
Buildings and Repairs	13.59	295.99
Total	$18,634.17	$13,602.47
Balance December 31, 1912	$ 3,558.02	$ 241.65

Table VII.—Receipts and Disbursements for the Year Ending December 31, 1913.

	Crop Pest	Scientific Investigation
RECEIPTS		
Balance January 1, 1913	$ 3,558.02	$ 241.65
State Appropriation	15,000.00	10,000.00
Total	$18,558.02	$10,241.65
DISBURSEMENTS		
Salaries	$ 8,482.44	$ 5,344.10
Labor	786.34	349.72
Publications	3,703.67	
Postage, Stationery, and Telephone	114.45	70.26
Freight and Express	77.37	16.15
Heat, Light, Water	1.00	8.50
Chemical Supplies	76.88	465.80
Sundry Supplies	562.80	236.26
Fertilizer	12.45	
Feeding Stuffs		1,791.71
Library	262.07	
Tools, Machinery	19.85	224.74
Furniture and Fixtures	76.05	47.25
Scientific Apparatus	178.87	95.65
Live Stock		112.75
Traveling Expense	995.91	113.35
Contingent Expense		25.50
Buildings and Repairs		214.27
Total	$15,350.15	$ 9,116.01
Balance December 31, 1913	$ 3,207.87	$ 1,125.64

Table VIII.—Receipts and Disbursements January 1 to September 30, 1914.

	Crop Pest	Investigation Scientific
RECEIPTS		
Balance January 1, 1914	$ 3,207.87	$ 1,125.64
State Appropriation	15,000.00	10,000.00
Total Available	$18,207.87	$11,125.64
DISBURSEMENTS		
Salaries	$ 8,316.83	$ 4,578.42
Labor	524.51	250.20
Publications	100.71	61.66
Postage and Stationery	33.94	37.34
Telegraph and Telephone	13.45	14.70
Freight and Express	114.33	65.91
Chemical Supplies	102.20	213.25
Sundry Supplies	562.62	1,497.45
Fertilizer	19.01	
Feeding Stuffs		766.03
Library	786.05	7.00
Tools, Machinery	21.45	39.23
Furniture and Fixtures	132.18	159.77
Scientific Apparatus	418.88	404.76
Live Stock		1.00
Traveling Expense	685.41	169.15
Buildings and Repairs	17.75	25.02
Total	$11,849.32	$ 8,290.89
Balance September 30, 1914	$ 6,358.55	$ 2,834.75

Table IX.—Branch Experiment Stations.

January 1, 1913, to December 31, 1913.

	Union Eastern Or.	Hermiston Umatilla	Moro Dry Farm	Harney Co. Burns	Southern Or. Talent	Hood River	J. J. Astor
Appropriation	$7,500.00	$3,000.00	$2,500.00	$4,000.00	$5,000.00	$3,000.00	$3,000.00*
Disbursements							
Salaries	$2,035.00	$2,085.00	$	$2,020.36	$2,199.19	$1,713.87	
Labor	2,015.14	203.10	1,624.11	542.57	1,372.84	153.62	
Publications	20.00	4.05					
Postage and Stationery	36.70	23.97	45.96	119.48	30.71	62.37	
Freight and Express	2.68	49.33	24.82	211.95	94.38	17.68	
Heat, Light, Water	52.00		88.41		21.80	2.65	
Chemical Supplies			1.25				
Sundry Supplies	281.49	64.77	136.10	388.03	429.26	67.40	
Fertilizer			7.50	5.85	58.00		
Feeding Stuffs	139.96	4.96	88.68	35.20	250.59		
Library					2.45		
Tools, Implements, Machinery	257.25	37.00	145.55	312.00	67.55	391.60	
Furniture and Fixtures	25.80		36.75	26.50		71.90	
Scientific Apparatus				11.70			
Livestock	12.50		164.75	93.15			
Traveling Expense	11.90	143.15	1.25	179.50	13.15	333.40	
Contingent Expense	6.50	1.20			1.77	3.00	
Buildings and Repairs	2,601.53	86.11	132.43	52.77	414.60	180.00	
Total	$7,498.45	$2,702.64	$2,497.56	$3,999.06	$4,956.29	$2,997.49	None
Balance Dec. 31, 1913**	1.55	297.36	2.44	.94	43.71	2.51	$3,000.00

*John Jacob Astor not used until 1914.
**Balances shown are covered by obligations.

Table X.—Branch Experiment Stations.

January 1, 1914, to September 30, 1914.

	Union Eastern Or.	Hermiston Umatilla	Moro Dry Farm	Harney Co. Burns	Southern Or. Talent	Hood River	J. J. Astor
Appropriation	$7,500.00	$3,000.00	$2,500.00	$4,000.00	$5,000.00	$3,000.00	$3,000.00
Disbursements							
Salaries	$3,206.83	$1,245.10	$ 385.00	$1,541.88	$2,156.65	$1,795.48	$ 400.00
Labor	1,354.10	401.71	1,429.44	1,033.04	582.07	296.48	1,295.97
Postage and Stationery	16.15	10.50		5.38	31.19	53.90	
Freight and Express	29.42	9.40	7.41	49.56	68.54	11.00	
Heat, Light, Water	38.10	21.06				8.85	
Chemical Supplies			8.00			9.45	
Sundry Supplies	127.92	117.93	105.49	340.21	304.08	74.93	112.50
Fertilizer					41.15	47.35	
Feeding Stuffs			34.03	742.00	365.51		
Tools, Machinery	340.00	47.65	1.60	91.14	84.65	190.35	
Furniture and Fixtures	2.50				55.25		
Scientific Apparatus					4.75	30.55	
Live Stock				150.00			675.00
Traveling Expense	11.95	41.20		18.35	78.64	270.82	113.20
Buildings and Repairs	943.63	491.78	171.10	1.69	13.90	190.40	
Telegraph and Telephone	17.95	2.80	11.75	17.87	12.00	9.58	
Total	$6,088.55	$2,389.13	$2,153.82	$3,991.12	$3.798.38	$2,999.14	$2,596.67
Balance Sept. 30, 1914	$1,411.45	$ 610.87	$ 346.18	$ 8.88	$1,201.62	$ .86	$ 403.33

Table XI.—Miscellaneous Receipts—Branch Experiment Stations.

January 1, 1913, to September 30, 1914.

	Eastern Oregon Union	Umatilla Hermiston	Moro Dry Farm	Southern Ore. Talent
RECEIPTS				
Balance January 1, 1913	$ 6,075.18	$ 650.56	$ 343.96	$
Sales, etc.	12,392.46		301.15	51.22
Total Receipts	$18,467.64	$ 650.56	$ 645.11	$ 51.22
DISBURSEMENTS				
Salaries	$ 865.00	$	$	$ 50.81
Labor	2,522.97		184.01	
Publications	5.50	14.25		
Postage and Stationery	21.45	1.39	24.28	.41
Telegraph and Telephone	6.95			
Freight and Express	91.91	3.88	47.42	
Heat, Light, Water	20.65			
Sundry Supplies	245.68	1.00	40.75	
Fertilizer	27.55			
Feeding Stuffs	68.65		53.50	
Tools, Machinery	128.76	590.10	138.25	
Furniture and Fixtures	3.45			
Scientific Apparatus	1.25			
Live Stock	6,455.75			
Traveling Expense	143.35	13.00	16.55	
Contingent Expense	4.20			
Buildings and Repairs	849.17	6.50	15.15	
Total Disbursements	$11,462.24	$ 630.12	$ 519.91	$ 51.22
Balance Sept. 30, 1914	$ 7,005.40*	$ 20.44	$ 125.20	None

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*Contracts for purchase of cattle will offset balance.

Table XII.—Hood River County Fund—Experiment Station.

Appropriation by Hood River County 1913		$2,000.00
1914		$2,000.00
Total Receipts		$4,000.00
Disbursements to September 30, 1914		
Salaries	$1,025.15	
Postage and Stationery	31.08	
Freight and Express	24.33	
Heat, Light, Water	22.26	
Chemical Supplies	91.66	
Sundry Supplies	69.75	
Library	94.34	
Tools, Machinery	37.80	
Furniture and Fixtures	132.90	
Scientific Apparatus	308.56	
Traveling Expense	277.49	
Building and Repairs	169.90	
Telegraph and Telephone	9.90	
Total Disbursements		$2,295.12
Balance September 30, 1914		$1,704.88

III—EXTENSION SERVICE.

Table XIII.—Receipts and Disbursements for the Calendar Year Ending December 31, 1913.

RECEIPTS		
State Appropriation 1913		$25,000.00
DISBURSEMENTS		
Salaries	$17,854.77	
Labor	547.52	
Publications	805.20	
Postage and Stationery	374.24	
Telephone and Telegraph	155.59	
Freight and Express	47.16	
Heat, Lignt, Water	22.87	
Office Supplies	31.00	
Sundry Supplies	1,434.09	
Library	13.80	
Tools, Machinery	427.05	
Furniture and Fixtures	290.68	
Traveling Expense	2,842.33	
Contingent Expense	153.70	
Total Disbursements		$25,000.00

Table XIV.—Receipts and Disbursements January 1, 1914, to September 30, 1914.

RECEIPTS		
State Appropriation		25,000.00
DISBURSEMENTS		
Salaries	$ 7,076.52	
Labor	1,857.12	
Publications	961.73	
Postage and Stationery	385.58	
Telephone and Telegraph	187.50	
Freight and Express	82.10	
Chemical Supplies	104.34	
Sundry Supplies	514.87	
Feeding Stuffs	17.64	
Library	.75	
Tools, Machinery	25.50	
Furniture and Fixtures	264.60	
Scientific Apparatus	33.92	
Traveling Expense	1,737.87	
Total Disbursements		13,250.04
Balance September 30, 1914		$11,749.96

Table XV.—Educational Extension.

AGRICULTURAL INSTITUTES--	1912 Jan. 1 to Dec. 31	1913 Jan. 1 to Dec. 31	1914 Jan. 1 to Sept. 30
State Appropriation	$2,500.00	$2,500.00	$2,500.00
DISBURSEMENTS			
Salaries	100.00		
Labor	48.00	11.65	43.50
Publications	170.18	42.11	
Postage and Stationery	29.11	17.18	.27
Freight and Express	16.25		
Chemical Supplies	12.00		
Sundry Supplies	104.31	204.11	2.85
Feeding Stuffs	1.30		
Tools, Machinery	45.37		
Furniture and Fixtures	7.50		
Scientific Apparatus	10.00		
Traveling Expense	1,955.98	2,219.95	1,285.44
Contingent		5.00	
Total	$2,500.00	$2,500.00	$1,332.06
BALANCE	None	None	$1,167.94

Table XVI.—Cooperative Dairy Demonstration.

Receipts and Disbursements to September 30, 1914.

RECEIPTS		
State Appropriation 1913-1914 (two years)		$5,000.00
DISBURSEMENTS		
Salaries	$ 548.71	
Labor	27.55	
Publications	13.85	
Postage and Stationery	10.92	
Telephone and Telegraph	12.66	
Freight and Express	6.88	
Sundry Supplies	24.55	
Tools, Machinery	43.04	
Furniture and Fixtures	41.90	
Scientific Apparatus	14.50	
Traveling Expense	1,236.43	
Building and Repairs (Rents)	30.00	
Total Disbursements		$2,010.99
Balance September 30, 1914		$2,989.01

Table XVII.—Cooperative Farm Management.

Receipts and Disbursements to September 30, 1914.

RECEIPTS		
State Appropriation 1913-1914 (two years)		$5,140.00
Salaries	$1,151.03	
Labor	48.68	
Postage and Stationery	3.95	
Telephone and Telegraph	4.45	
Sundry Supplies	5.00	
Furniture and Fixtures	36.95	
Traveling Expense	751.30	
Total Disbursements		$2,001.36
Balance September 30, 1914		$3,138.64

Table XVIII.—State Club—Extension.

Receipts and Disbursements to December 10, 1914.

RECEIPTS		
State Appropriation 1914		$2,700.00
DISBURSEMENTS		
Salaries	$ 166.84	
Labor	67.48	
Publications	38.10	
Postage and Stationery	5.00	
Sundry Supplies	4.00	
Furniture and Fixtures	36.55	
Traveling Expense	393.00	
Total Disbursements		710.97
Balance December 10, 1914		$1,989.03

Table XIX.—Coos County Educational Extension.

Receipts and Disbursements to December 10, 1914.

	State Appropriation	County Appropriation
RECEIPTS		
1913-14	$2,000.00	$2,000.00
DISBURSEMENTS		
Salaries	$ 875.00	$1,000.00
Labor	7.25	
Heat, Light, Water	2.00	
Sundry Supplies	12.80	
Furniture and Fixtures	44.50	
Traveling Expense	259.90	
Building and Repairs	22.00	
Telephone and Telegraph	12.65	
Total Disbursements	$1,236.10	$1,000.00
Balance December 10, 1914	$ 763.90	$1,000.00

Table XX.—Crook County Educational Extension.

Receipts and Disbursements to December 10, 1914.

	State Appropriation	County Appropriation
RECEIPTS		
1914	$1,500.00	$1,500.00
DISBURSEMENTS		
Salaries	$	$1,125.00
Labor	13.00	
Postage and Stationery	9.25	
Freight and Express	1.00	
Sundry Supplies	1.00	
Tools, Machinery	36.40	
Furniture and Fixtures	46.50	18.00
Traveling Expense	302.15	
Building and Repairs	6.00	
Telephone and Telegraph	14.10	
Total Disbursements	$ 429.40	$1,143.00
Balance December 10, 1914	$1,070.60	$ 357.00

Table XXI.—Harney County Educational Extension.

Receipts and Disbursements to December 10, 1914.

	State Appropriation	County Appropriation
RECEIPTS		
1913-14	$2,000.00	$2,000.00
DISBURSEMENTS		
Salaries	$ 451.98	$1,197.18
Labor	800.76	
Postage and Stationery	34.82	
Freight and Express	40.85	
Sundry Supplies	173.97	
Tools, Machinery	79.85	
Traveling Expense	386.58	
Contingent Expense	23.10	
Building and Repairs	1.69	
Total Disbursements	$1,993.60	$1,197.18
Balance December 10, 1914	6.40	802.82

Table XXII.—Jackson County Educational Extension.

RECEIPTS	State Appropriation	County Appropriation
1914	$2,000.00	$2,000.00
DISBURSEMENTS		
Salaries	$ 999.96	$ 249.99
Postage and Stationery	1.00	
Sundry Supplies	6.00	13.25
Tools, Machinery	543.92	485.04
Furniture and Fixtures	122.63	
Traveling Expense	74.20	114.24
Building and Repairs	22.00	20.00
Total Disbursements	$1,769.71	$ 882.52
Balance December 10, 1914	$ 230.29	$1,117.48

Table XXIII.—Klamath County Educational Extension.

Receipts and Disbursements to December 10, 1914.

RECEIPTS	State Appropriation	County Appropriation (Paid in)
1913-14	$2,000.00	$1,000.00*
DISBURSEMENTS		
Salaries	$ 495.03	$ 948.00
Postage and Stationery	14.30	
Freight and Express	17.05	
Sundry Supplies	81.85	
Fertilizer	16.87	
Tools, Machinery	138.25	
Furniture and Fixtures	83.75	
Traveling Expense	131.35	
Building and Repairs	5.00	
Total Disbursements	$ 983.45	$ 948.00
Balance December 10, 1914	$1,016.55	$ 52.00

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*$1000 balance due

Table XXIV.—Lane County Educational Extension.

Receipts and Disbursements to December 10, 1914.

RECEIPTS	State Appropriation	County Appropriation (Paid in)*
1914	$2,000.00	$1,500.00
DISBURSEMENTS		
Salaries	$ 600.00	$ 648.39
Labor	20.00	
Postage and Stationery	22.45	2.60
Freight and Express	21.83	1.00
Sundry Supplies	42.54	
Tools, Machinery	30.00	539.70
Furniture and Fixtures	50.75	
Traveling Expense	456.45	48.21
Equipment	144.00	
Telephone and Telegraph	11.50	.25
Total Disbursements	$1,399.52	$1,240.15
Balance December 10, 1914	$ 600.48	$ 259.85

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*$500 balance due

Table XXV.—Malheur County Educational Extension.

Receipts and Disbursements to December 10, 1914.

	State Appropriation	County Appropriation (Paid in)*
RECEIPTS		
1913	$1,500.00	$1,125.00
1914	1,500.00	
Total Receipts	$3,000.00	$1,125.00
DISBURSEMENTS		
Salaries	$ 250.00	$ 750.00
Labor	6.60	
Postage and Stationery	9.20	
Freight and Express	1.15	
Sundry Supplies	5.95	
Tools, Machinery	79.90	
Furniture and Fixtures	38.50	
Traveling Expense	286.85	
Telephone and Telegraph	1.50	
Total Disbursements	$ 679.65	$ 750.00
Balance December 10, 1914	$2,320.35	$ 375.00

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* $375.00 balance due.

Table XXVI.—Marion County Educational Extension.

Receipts and Disbursements to December 10, 1914.

	State Appropriation	County Appropriation
RECEIPTS		
1914	$ 750.00	$ 750.00
DISBURSEMENTS		
Salaries	$ 627.30	$ 422.70
Labor	6.85	4.60
Postage and Stationery		3.55
Freight and Express		3.55
Sundry Supplies	9.00	6.19
Tools, Machinery		41.00
Traveling Expense	106.85	203.38
Total Disbursements	$ 750.00	$ 684.77
Balance December 10, 1914	None	$ 65.23

Table XXVII.—Tillamook County Educational Extension.

Receipts and Disbursements to December 10, 1914.

	State Appropriation	County Appropriation (Paid in)*
RECEIPTS		
1914	$2,000.00	$1,500.00
DISBURSEMENTS		
Salaries	$ 300.00	$ 900.00
Postage and Stationery	4.63	7.75
Freight and Express	1.56	
Sundry Supplies	18.74	4.84
Fertilizer	4.75	
Tools, Machinery	19.25	
Furniture and Fixtures	46.00	
Scientific Apparatus	70.50	
Traveling Expense	207.73	64.55
Telephone and Telegraph	5.85	
Total Disbursements	$ 679.01	$ 977.14
Balance December 10, 1914	$1,320.99	$ 522.86

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*$500 balance due.

Table XXVIII.—Union County Educational Extension.

Receipts and Disbursements to December 10, 1914.

	State Appropriation	County Appropriation (Paid in)*
RECEIPTS		
1913	$ 500.00	$ 500.00
1914	1,200.00	400.00
Total Receipts	1,700.00	$ 900.00
DISBURSEMENTS		
Salaries	$1,265.00	$ 600.00
Labor		5.00
Postage and Stationery	10.90	6.10
Freight and Express	2.16	
Sundry Supplies	23.20	113.37
Tools, Machinery	.40	
Furniture and Fixtures	108.67	
Traveling Expense	280.40	139.40
Telephone and Telegraph	7.80	
Total Disbursements	$1,698.53	$ 863.87
Balance December 10, 1914	$ 1.47	$ 36.13

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*$800 balance due

Table XXIX.—Multnomah County Educational Extension.

Receipts and Disbursements
1913

	State appropriation	County appropriation*
RECEIPTS		
1913	$ 500.00	
DISBURSEMENTS		
Salaries	$ 500.00	

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*The County fund of $500.00, while expended under the supervision of the Extension Service, was not turned over to the institution; but accounts were audited in Multnomah County.

IV—MISCELLANEOUS FUNDS.

Table XXX.—Mining Bureau Receipts and Disbursements.

	Jan. 1, 1912 to Dec. 31, 1912	Jan. 1, 1913, to Dec. 31, 1913
MINING BUREAU		
State Appropriation	$1,000.00	$1,000.00
DISBURSEMENTS		
Salaries	$ 270.00	$ 130.00
Labor	116.68	41.65
Publications	309.84	5.06
Postage and Stationery	1.65	63.60
Freight and Express	12.95	21.18
Sundry Supplies	2.00	2.80
Library		2.00
Tools, Machinery		4.00
Scientific Apparatus		568.35
Traveling Expense	286.88	161.36
Total	$1,000.00	$1,000.00

Table XXXI.—Pure Seed Fund.

Receipts and Disbursements to September 30, 1914.

RECEIPTS		
State Appropriation 1913-14		$1,000.00
DISBURSEMENTS		
Salaries	$ 928.34	
Office Supplies	5.00	
Traveling Expense	7.20	
Equipment	41.86	
Total Disbursements		982.40
Balance September 30, 1914		$ 17.60

ESTIMATES OF REQUIREMENTS.

Estimates of financial requirements for the years 1915 and 1916 for (1) additional salaries, (2) general or miscellaneous maintenance, (3) repairs, (4) improvements, (5) equipment.†

Additional Instructors and Assistance.

Following is a list of instructors and assistance for each of the years 1915 and 1916, in addition to the present force for resident instruction:

	Additional Salary Requirements		
	1915	1916	Biennium
Professor of Farm Management	$ 2,500	$ 2,500	$ 5,000
Instructor in Veterinary Medicine and Animal Husbandry	600*	1,200	1,800
Instructor in Dairy Husbandry	1,200	1,200	2,400
Instructor in Bacteriology	.....	1,200	1,200
Instructor in Poultry Husbandry	700*	700*	1,400
Instructor in Botany and Plant Pathology	1,200	1,200	2,400
Instructor in Zoology	.....	1,000	1,000
Instructor in Vegetable and Landscape Gardening	1,000	1,200	2,200
Instructor in Veterinary Medicine	600*	1,200	1,800
Instructor in Highway and Experimental Engineering	1,500	1,500	3,000
Instructor in Mechanical Drawing	1,100	1,150	2,250
Instructor in Electrical Construction and Machine Shop	1,300	1,350	2,650
Metallurgist and Engineering Chemist	1,500	1,500	3,000
Instructor in Domestic Science	1,200	1,300	2,500
Instructor in Household Administration	.....	600*	600
Instructor in Domestic Art	.....	1,200	1,200
Instructor in Domestic Art	800	1,000	1,800
Instructor in Forestry	1,200	1,400	2,600
Instructor in Pharmacy	1,200	1,200	2,400
Instructor in Agricultural Economics	1,400	1,500	2,900
Instructor in Political Science	400*	600*	1,000
Instructor in Business Administration	.....	450*	450
Instructor in Chemistry of Foods	500*	1,000	1,500
Instructor in Agricultural Chemistry	1,200	1,400	2,600
Instructor in Mathematics and Physics	1,000	1,200	2,200
Instructor in English	600*	1,000	1,600
Instructor in Freehand Drawing	1,000	1,200	2,200
Teaching Fellow in Agronomy	500	500	1,000
Teaching Fellow in Bacteriology	500	.....	500
Teaching Fellow in Zoology	500	.....	500
Student Assistance in Zoology	200	100	300
Student Assistance in Horticulture	100	100	200
Student Assistance in Veterinary Medicine	150	150	300
Student Assistance in Engineering Laboratory	100	100	200
Student Assistance in Agricultural Economics	100	100	200
Student Assistance in Political Science	150	150	300
Office Assistance in Business Administration	400	400	800
Student Assistance in Chemistry	200	200	400
Stenographer in College Exchange	720	720	1,440
Miscellaneous labor in College Exchange	250	250	500
	$27,570	$34,720	$62,290

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†For discussion and recapitulation of financial requirements, see statement beginning on page XLVII.

*Part time.

General or Miscellaneous Maintenance.

Summary of requirements for general or miscellaneous maintenance. The requirements for class, laboratory, and shop supplies are excluded, as these items are completely covered by student class, laboratory, and shop fees.

Janitorial, including salaries, labor, supplies, etc.	$13,100	
Heating, including salaries, labor, supplies, etc.	13,750	
Campus and Greenhouses, salaries, labor, supplies, etc.	7,000	
Publications	7,000	
Traveling expenses	5,500	
Light and power	5,000	
Water tax	1,500	
Summer school, including salaries of special instructors	3,000	
Winter short courses	2,000	
Advertising	3,500	
Telephone and telegraph	1,000	
Office and sundry supplies	6,000	
Livery and auto hire, expenses of convocation speakers, commencement, etc.	750	$ 69,100
Total for two years		$121,400

Repairs.

Below is a summary of the repairs to the buildings listed. The estimates cover the necessary repairs including interior and exterior painting, refinishing floors, repairing plastering, replacing window shades, refitting doors and windows, repairing down-spouts, roofs, roof gutters, etc.*

Administration Building	$ 649	
Agricultural Building	1,438	
Agronomy Building	892	
Armory	760	
Cauthorn Hall	675	
Dairy Building	935	
Farm Mechanics	452	
Home Economics	525	
Horticultural Hall	815	
Mechanical Hall	1,530	
Mechanic Arts and Shops	1,033	
Men's Gymnasium	665	
Mines Building	579	
New Heating Plant	148	
Old Heating Plant	199	
Poultry Building	630	
Science Hall	1,767	
Women's Gymnasium	1,651	
Waldo Hall	2,708	
Stock Barn and Judging Pavilion	655	$18,706

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*The estimate by the Superintendent of Buildings of the repairs he considers desirable, aggregate $46,690. These include, however, comparatively expensive repairs to the Armory, Waldo Hall, and Science Hall, some of which, it is thought, can be delayed for another biennium. The total given above is the least that will suffice to keep the buildings in reasonably good repair. In some of the buildings small allowances are made for repairing articles of equipment, such as desks, chairs, and other furniture in the various laboratories and class rooms.

Improvements.

Following is a summary of the most urgently needed improvements, exclusive of buildings, for the years 1915 and 1916:

Drives—		
Jefferson Street extended to 26th Street, 1440 yards @ 50c per yard	$ 792.00	
1620 lineal feet curb @ 35c	576.00	
Grading and miscellaneous	335.00	
Service drives in rear of Waldo Hall, 700 square yards @ 50c	350.00	
26th Street north to property line, 2,880 yards @ 50c	1,440.00	
Service drives to three entrances at rear of Agricultural Building, 440 square yards @ 50c, and miscellaneous	242.00	
Service drive, consisting of gravel, to Home Economics Building from north side	125.00	
Extension of drive running west, north of Home Economics Building, 1,387 square yards	776.00	
Service drive to Gymnasium, 310 square yards @ 50c	155.00	$ 4,791.00
Walks—		
810 feet walk, 8 feet wide, 6,480 square feet @ 10c	$ 648.00	
Cement walks in Poultry Plant, 3,750 square feet @ 10c, plus grading	425.00	
Concrete walk east of Home Economics Building, with approaches, 4,280 square feet @ 10c, plus grading	449.00	
Cement walks near Armory, including grading and excavation, 2,700 square feet	341.00	$ 1,863.00
Campus General—		
Grading south of new Gymnasium, seeding to lawn, including water pipes	$1,240.00	
Grading and seeding lawns about Cauthorn Hall and Poultry Building, and west and south of Waldo Hall	425.00	
Grading and seeding west of Agricultural Building	175.00	
Grading about Home Economics Building, and seeding to lawn	100.00	
Improving and seeding to lawn area near Armory on 16th Street, including planting of vines, etc.	120.00	
Seeding to lawn areas near Mines Building	90.00	
Plowing, harrowing, finishing, and seeding west quadrangle	125.00	
Plantations around Dairy Building	200.00	$ 2,475.00
Fire Protection Apparatus—		
770 feet of 8-in. pipe in place @ 45c per foot	$ 346.50	
1630 feet of 6-in. pipe in place @ 38c per foot	619.40	
720 feet of 4-in. pipe in place @ 32c per foot	230.40	
15 Corey Hydrants in place @ $50 each	750.00	
20 cast iron tees to make connection	182.00	
19 gate valves	225.00	
30 feet 4-in. cast iron pipe @ 35c per foot	10.50	
105 chemical hand extinguishers @ $8 each	840.00	
8 Pyrene extinguishers @ $6 each	48.00	
16 pick axes @ $1.50	24.00	
2 sixty-gallon hand chemical fire engines with hose and all necessary attachments	950.00	
300 lbs. of lead @ 9c per pound	27.00	
Structure for housing chemical engines	50.00	$ 4,302.80

Poultry Husbandry—		
For completion of poultry fencing	$ 185.00	
Poultry houses	300.00	
Storage and service shed	250.00	
Water system	150.00	$ 885.00
Plumbing—		
Administration Building	$ 175.00	
Armory	300.00	
Shops	200.00	
Waldo Hall	2,500.00	
Domestic Science Building	125.00	
Drinking Fountains	175.00	
Miscellaneous, in various buildings	340.00	$ 3,815.00
Miscellaneous—		
Permanent manure yard, with cement base for storage of all farm manure	$ 600.00	
Fencing, 500 rods 4-ft. woven wire @ $1.10 per rod	550.00	
New stalls in east wing of dairy barn	400.00	$ 1,550.00
Total		$19,681.80

Equipment.

Following is a summary of estimated requirements for equipment for the years 1915 and 1916:

Furniture and miscellaneous articles of equipment for offices of Registrar, Business Office, President, Deans, College Exchange, etc.		$ 2,350
Agronomy, including—		
Field crops	$1,479	
Farm Mechanics	683	
Drainage	250	
Irrigation	838	
Climatology	346	
Soils	1,126	
Farm and general	428	5,150
Animal Husbandry, including—		
Machinery and tools	$1,000	
Live stock	6,500	7,500
Bacteriology—		
Scientific apparatus and cases		1,500
Botany and Plant Pathology, including scientific apparatus, tables and cases, and herbarium		2,050
Dairy Husbandry, including—		
Creamery equipment	$1,528	
Laboratories	1,105	
Dairy production—farm implements and live stock	1,767	4,400
Entomology—scientific apparatus		750
Poultry Husbandry, including—		
Apparatus, furniture, etc.	$ 660	
Fowls for class demonstrations	200	860
Horticulture—apparatus, desks, etc.		1,050
Zoology and Physiology—scientific apparatus, student desks, chairs, etc.		1,325

Veterinary Science—scientific and special apparatus		1,650
Highway engineering		2,760
Irrigation engineering		897
Electrical engineering—		
General laboratory	$1,875	
Standards laboratory	2,535	
Other electrical apparatus	1,870	6,280
Electrical construction		5,332
Mechanical engineering, Industrial Arts & Shops, including machine shop, woodwork shop, foundry, blacksmith shop, plumbing shop		5,135
Mining Engineering, including—		
Ore-dressing laboratory	$ 700	
Assaying & Metallurgical Laboratories	800	
Ceramic laboratory	381	
Geology, Mineralogy, Petrology, and Petrography laboratories	750	2,631
Home Economics, including—		
Domestic science laboratories	$2,471	
Domestic art laboratories	1,790	
Cafeteria	1,484	5,745
Forestry and logging engineering—scientific apparatus, transits, etc.		2,100
Experimental engineering, including—		
Materials laboratory	$2,150	
Gas engineering laboratory	721	
Refrigeration engineering laboratory	450	
General equipment	141	
Steam engineering laboratory	560	
Power equipment and miscellaneous	999	5,021
Commerce, including—		
Business administration	$ 149	
Economics and commercial museum	948	
Political Science	126	
Office training and business practice	462	
Bureau of organizations and markets	145	1,830
Pharmacy—scientific apparatus	$2,025	
Chemistry—scientific apparatus, desks and plumbing	6,625	
Physics—scientific apparatus	1,240	
Mathematics and English—furniture, cabinets, blackboards, charts, and models	809	
Art and architecture—drawing stands, lockers, desks, stools, apparatus	1,816	
Library—filing cases or cabinets, etc.	632	
Physical education for men—apparatus	2,580	
Physical education for women—apparatus	2,952	
Military Science—ordnance including freight	300	
Print Shop—machinery, etc.	1,000	
Superintendent of buildings—general service equipment	735	
Total equipment for biennium		$87,031

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OREGON AGRICULTURAL COLLEGE

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BIENNIAL REPORT

OF THE

PRESIDENT OF THE COLLEGE

1906-1908

COLLEGE BULLETIN ISSUED QUARTERLY SERIAL NUMBER 28

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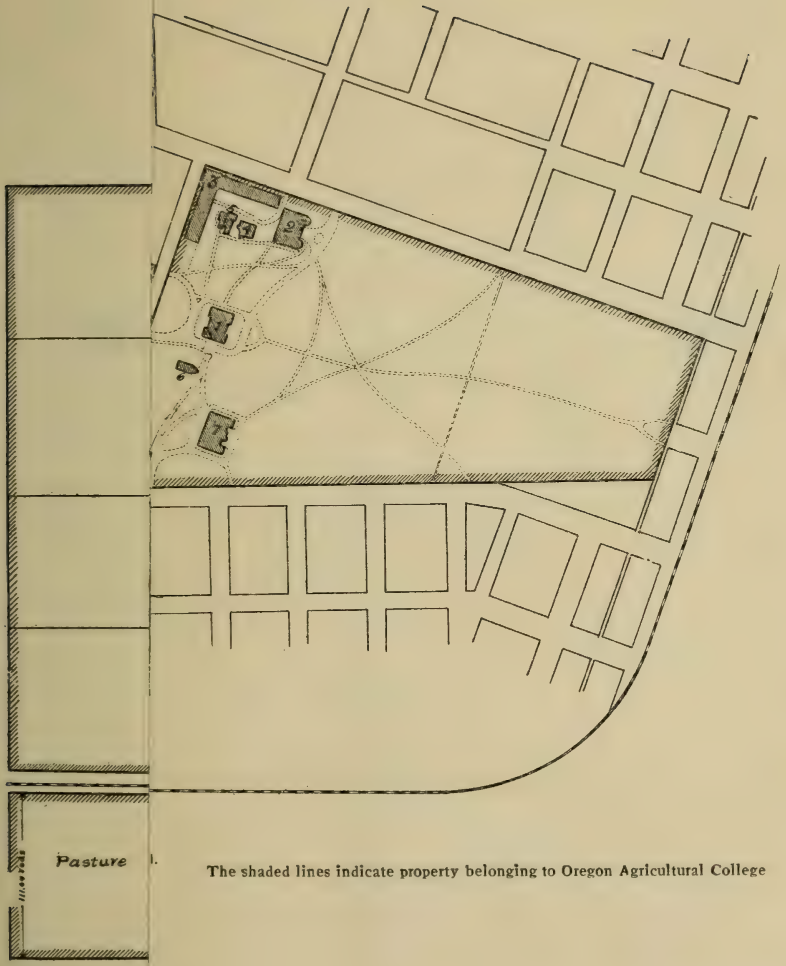


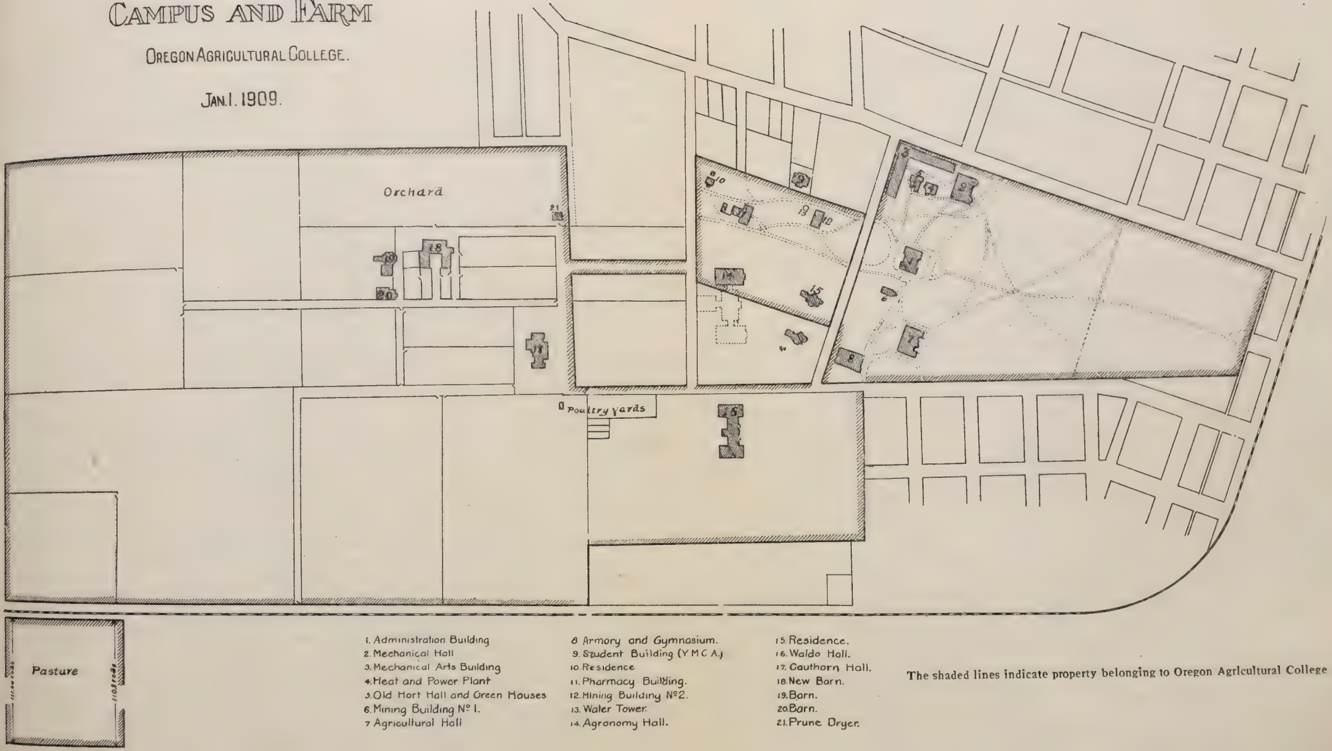
1.

The shaded lines indicate property belonging to Oregon Agricultural College

CAMPUS AND FARM

OREGON AGRICULTURAL COLLEGE.

JAN. 1. 1909.



1. Administration Building
2. Mechanical Hall
3. Mechanical Arts Building
4. Heat and Power Plant
5. Old Hort Hall and Green Houses
6. Mining Building No 1.
7. Agricultural Hall
8. Armory and Gymnasium.
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11. Pharmacy Building.
12. Mining Building No2.
13. Water Tower.
14. Agronomy Hall.
15. Residence.
16. Waldo Hall.
17. Cauthorn Hall.
18. New Barn.
19. Barn.
20. Barn.
21. Prune Dryer.

The shaded lines indicate property belonging to Oregon Agricultural College

OREGON AGRICULTURAL COLLEGE

BIENNIAL REPORT

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OREGON AGRICULTURAL COLLEGE

PRESIDENT'S BIENNIAL REPORT

1906-1908

To the Board of Regents:

The President of the College has the honor to submit to the Board of Regents the following report for the years 1906-1907 and 1907-1908, together with a statement of the condition of the institution and an estimate of the requirements for the biennial period beginning July 1, 1909. For more detailed information your attention is respectfully invited to the appended reports and official College publications, which are submitted as a part of this report. The Appendices include:

1. Reports of Schools and Departments of Instruction.
2. The Report of the Librarian.
3. The Report of the Registrar.
4. The Report of the Director of the Experiment Station.
5. The Report of the Farmers' Institutes.
6. Report on Heat, Light, and Power.
7. Itemized Estimates of Requirements.
8. The Farmers' Institute Annual for 1908.
9. The annual reports of the Experiment Station for the past two years.

STUDENTS.

The number of students enrolled in the College in 1906-1907 was 833. In 1907-1908 the enrollment was 1,156, an increase of 323, or more than thirty-eight per cent over the

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previous year. If the students who pursued music only, and those who attended the summer school in 1907-1908, be excluded, the increase is thirty-four per cent. The table in the Registrar's report, giving the geographical classification of students, shows that in 1906-1907 the attendance represented all the counties in Oregon but one, seventeen different states and territories, and two foreign countries; in 1907-1908, all the counties of Oregon, twenty different states and two foreign countries. The total number of students from Oregon was 1,042, and from other states and countries 114. The registration for the present year is incomplete, as many students enter in January. The total enrollment on December 14, 1908, was 1,118, which, compared with the enrollment on the same date of preceding years, would indicate a probable total registration for the year of about 1,400. Moreover, this large increase in the attendance does not fully indicate the rapidity of the institution's growth and of the amount of work required. As shown elsewhere in this report, there has been an increase of from 75 per cent to more than 900 per cent in the amount of advanced work actually given in the different courses. Such an increase in so short a time is not only unusual but is extraordinary, as shown by the following table which gives the student attendance extending over a period of eight years at a number of representative institutions. This table has been compiled from the reports of the United States Commissioner of Education up to June 30, 1907, and from the presidents' reports or the catalogues of the respective institutions for the year 1907-1908.

Enrollment Distribution.

Increase in Attendance.

Table showing attendance for each year from 1900-1901 to 1907-1908; also the increase of each year over the preceding year, the total and per cent of increase for the seven years, and the per cent of increase during the last biennium, 1906-1907 and 1907-1908.

INSTITUTION	1900 - 1901	1901 - 1902	Increase	1902 - 1903	Increase	1903 - 1904	Increase	1904 - 1905	Increase	1905 - 1906	Increase	1906 - 1907	Increase	1907 - 1908	Increase	Total increase	Per cent increase for seven years	Per cent increase '07-'08 over '06-'07
California, University of	2229	2470	141	2669	199	2688	19	2699	11	2839	140	2761	78*	2916	155	587	29	5
Colorado Agricultural College	387	488	61	493	45	433	60*	496	63	502	6	604	102	668	64	281	72	10
Idaho, University of	282	306	24	353	47	420	67	333	87*	310	23*	363	53	426	63	144	51	17
Iowa State College	1293	1520	227	1596	76	1985	389	1980	5*	2099	119	2381	282	2381	0	1088	84	0
Indiana—Purdue University	1049	1187	138	1339	152	1430	91	1534	104	2029	495	1820	209*	2085	265	1036	99	14
Kansas Agricultural College	1321	1396	75	1572	176	1605	33	1462	143*	1690	228	1937	247	2192	255	871	65	13
Michigan Agricultural College	662	689	27	854	165	923	69	1009	86	950	59*	1001	51	1191	190	529	79	18
Montana Agricultural College	279	276	3*	305	29	357	52	339	18*	362	23	372	10	419	47	140	50	12
New York—Cornell University	2521	2845	324	3018	173	3091	73	3318	227	3461	143	3523	62	3734	211	1213	48	6
Ohio State University	1465	1516	51	1717	201	1803	86	1835	32	2014	179	2277	263	2686	409	1221	83	18
Oregon Agricultural College	436	488	52	541	53	530	11*	680	150	735	55	833	98	1156	323	720	165	38
Washington State College	488	724	236	595	129*	653	58	793	140	1079	286	1100	21	1336	236	848	173	21

* Indicates decrease.

It will be observed from this table that the increase in attendance during the time given varies from thirty to one hundred and seventy-three per cent in the different institutions, the increase in the Oregon Agricultural College being twice that of any other institution except Washington State College, which during the eight years had an increase of eight per cent greater than that of this institution. It will also be seen that the lead of the Washington over the Oregon institution was gained during the first four years of this period. For the four years, 1904 to 1908, the increase in attendance at the Washington State College was one hundred and four per cent and that of the Oregon Agricultural College was one hundred and eighteen per cent; while, for the two years ending June 30, 1908, the increase was twenty-three and fifty-seven per cent respectively. It is also interesting to note that during the same period the increase for the Kansas Agricultural College, the Michigan Agricultural College, and the Iowa State College of Agriculture and Mechanic Arts, was respectively thirty, fourteen, and thirteen per cent, showing an increase for the Oregon Agricultural College of from nearly two to more than four times the increase in the other respresentative land-grant institutions. The increase in the registration for 1907-1908 over 1906-1907 varied with the different institutions named from five per cent at the University of California to thirty-eight per cent at the Oregon Agricultural College, the increase at this institution being nearly double that of the largest increase of the other institutions. Furthermore, the esimate given above of the probable total enrollment at the Oregon Agricultural College for the present year will show an increase during the two years, 1907-1909, of sixty-nine per cent. At the same rate of increase for the next biennium, the total College enrollment for the year 1910-1911 will reach upwards of 2,300. A very conservative estimate, therefore, will place the student attendance for the next two years above 2,000.

Comparative Growth.

The ages of students range from 15 to 50, the average age being 19.77. The two extremes are represented by 28 students 15 years of age, and 17 over 30 years of age. The largest numbers are between 17 and 20, there being 126, 203, 178, and 157 who are respectively 17, 18, 19, and 20. Of the students registered in 1906-1907, 617 were men, and 218 were women. In 1907-1908, 920 were men and 336 were women. Of the number registered on November 19, 1908, 807 were men and 265 were women.

Age of Students.

A table has been prepared showing the occupations of the students, or their parents or guardians, from which the following is a summary: Farmers, including dairymen, horticulturists, etc., 51 per cent; architects, engineers, miners, 14 per cent; mechanics, 11 per cent; merchants, druggists, bankers, hotel proprietors, 15 per cent; lumbermen, laborers, 10 per cent; employees, including bookkeepers and traveling salesmen, 4 per cent; lawyers, editors, physicians, teachers, 5 per cent. The table in detail, which is too lengthy for publication here, shows the wide range of the College constituency. Practically all of the professions and trades are represented, there being approximately 95 per cent of the students representing industrial occupations, while the remaining five per cent come from the homes of such professions as medicine, law, journalism, education, and the ministry.

Vocations Represented.

A recent investigation reveals some very interesting facts regarding the extent to which students of the College are engaged in work during the school year and the summer vacation as a means of paying their expenses at College. A summary of the statistics gathered shows that eighty-nine per cent of the students are either wholly or partially earning their own way. All of these work during the summer vacation, while about thirty-eight per cent are employed either at the College or in the city during the college year. Most of the remaining eleven per cent who are not employed either during the summer vacation or during the school year,

Students Earn Their Own Way.

are women who spend their summers at home and did not report any remunerative employment. It is not infrequently true that students have to omit a year or two in order to accumulate sufficient money to continue their work to completion. For this reason students have been known to require as many as six or seven years to complete their courses. The persistency and determination of purpose which carry these students through College under such adverse conditions, indicate the character of the men and women—because women as well as men make these sacrifices—who constitute the student body of the institution.

Character of Student Body.

In the Oregon Agricultural College, as in all other institutions with as many students in attendance, there are always a few whose habits of study and conduct are not in every way exemplary, and whose connection with the institution is therefore of short duration. But the great majority of students—in fact most of them—are men and women whose industry, earnestness of purpose, responsiveness, and general deportment, are most commendable. The way in which the students have responded in the matter of abolishing hazing, and other objectionable practices, and their manly and consistent support of the action taken on these questions, at times under great provocation, attest a force of character, a sense of obligation, and a spirit of loyalty, creditable alike to the students, to the College, and to the State.

Graduates.

Since 1870, 752 students have been graduated from the institution with degrees. In 1907 the graduating class numbered 64; in 1908, 84. A report of the officers of the Alumni Association, giving the directory and position of its members, shows that the graduates occupy many positions of responsibility and trust. Among them are lawyers, judges, engineers, merchants, druggists, journalists. Many are following different agricultural pursuits, and a number are in the Government Service. Twenty-eight are members of the College faculty, and upwards of seventy are teaching in other educational institutions; while forty-one are pursuing advanced work as graduate students in different colleges and universities.

FACULTY.

During the year 1906-1907, the faculty consisted of forty members, including the administrative officers, the librarian, and two instructors in Music who had private work only and received no compensation from the College. There were sixteen professors, one associate professor, three assistant professors, eleven instructors, and five assistants. A number of the members of the faculty divided their time between the work of instruction and of the Experiment Station, the instructional force being equivalent to the full time of twenty-six instructors.

Faculty Statistics.

During the year 1907-1908, the faculty comprised fifty-three members, exclusive of three instructors who had Music only. There were twenty-three professors, one assistant professor, sixteen instructors, and six assistants. Of these, one professor, two instructors, and three assistants, gave their entire time to station work; while nine professors and two instructors divided their time between the College and the Station. The instructional force for this year was equivalent to the full time of thirty-three instructors.

Division of Work.

For the present year the faculty numbers seventy-seven members, including administrative officers and four instructors in Music who receive no compensation from the College. There are twenty-four professors, three assistant professors, twenty-four instructors, and fifteen assistants. One professor and five assistants give their entire time to experimental work; while seven professors, three instructors, and two assistants divide their time between the College and the Station, and eight assistants are pursuing regular courses in the institution and give only part of their time to assistance in the laboratories. During this year the instructional force is equivalent to the full time of fifty instructors.

Ratio of Students to Teachers.

The ratio of instructors to students was, for the year 1906-1907, one to thirty-two; 1907-1908, one to twenty-three; while for the present year, estimating the total attendance at 1,425, the ratio would be one to twenty-eight. In order to insure efficient work, the number of students to each instructor should not exceed fifteen. The average in the large colleges and universities of the country is much smaller even than this. For example, the ratio of students to professors and instructors in Harvard is 8.8; in Stanford, 12; in Yale, 11.1; in Princeton, 8.2. In a number of representative land-grant institutions the ratio is as follows: Cornell, 10.3; California, 11.2; Wisconsin, 11; Illinois, 12; Michigan, 11.4; Massachusetts, 9.8; Montana, 8.4; Washington, 16.6; Kansas, 19; Iowa, 16.9; Indiana, 12.1. The average in all the land-grant institutions for 1907 was 11.5.

Notwithstanding the congested condition throughout the institution, occasioned by the large increase in attendance, with insufficient funds to provide for a corresponding increase in the room, equipment, and instructors, the work of the faculty has been marked by hearty, active, co-operation, and efficiency. Many members of the faculty have labored under very trying conditions, with unsuitable and insufficient room, inadequate equipment, excessive hours, and large classes. That they have remained with the institution, some of them at great personal sacrifice, receiving comparatively low salaries, has been due largely to their abounding faith in the future of the College, and to the attractiveness of the field in Oregon for work of research and instruction along industrial lines. In no other part of the country are there problems of greater interest to the scientific specialist. This is always a strong attractive power, but the College cannot expect long to retain the services of its best and most capable men on the present schedule of salaries.

In this connection it may not be inappropriate to direct attention to the position the Oregon Agricultural College occupies among other land-grant institutions in the matter

Salaries of Professors.

of salaries. From statistics compiled by the United States Commissioner of Education in his report for the year ending June, 1907, a table has been prepared showing the salaries paid by each land-grant college, to professors, assistant professors, instructors, and assistants. According to this table, the lowest salaries, without a single exception, are paid by the Oregon Agricultural College. Indeed, the salaries paid by many of the institutions to associate professors, and even to assistant professors, are higher than the salaries paid to full professors in this institution. For instance, the difference in the maximum salaries paid to professors by the Oregon Agricultural College and the Washington State College was $500; the Massachusetts Agricultural College, $1,000; the Iowa State College of Agriculture and Mechanic Arts, $2,000; the North Dakota Agricultural College, $550; the Kansas Agricultural College, 500; the Colorado Agricultural College, $500; the Montana Agricultural College, 400. While the salaries of the Oregon Agricultural College have been somewhat increased since 1907, there has also been, in most cases at least, as great an increase in the salaries paid by the other institutions named.

Strong Faculty Required.

No college can succeed without a strong faculty. Adequate buildings, adapted to particular purposes, and extended equipment, are indispensable in the work of a modern scientific school; but, after all, it is upon the faculty that an institution depends for its strength. It has been said of large commercial enterprises that the men make the business. It is no less true that the faculty make the college or the university. To insure thorough and efficient work there must be strong, capable men and women, of broad experience and high scholastic attainments, in charge of the several departments. The demand for industrial specialists in the agricultural colleges and experiment stations, in the United States departments of agriculture, and in various industrial enterprises, is far greater than the supply. It cannot be expected, therefore, that the College can retain in its service for any great length of time professors whose training, experience, and ability qualify them for the most successful work, unless the salaries approximate at least those paid by other similar institutions.

Importance of Permanency in Positions of Professors.

Changes in the heads of departments unavoidably result in changes in departmental method and policy, and impair the efficiency of the instructional as well as of the experimental work. It requires years of practical experience with students and in the administrative work of a department for a young man, whatever his scholastic attainments may be, to qualify for the responsibilities of a professorship. Moreover, time is required for a professor to become sufficiently acquainted throughout the State to insure the proper adaptation of his work to local conditions. This is no less true of the instructional work, in the technical departments at least, than it is of the work of research and experiment. Hence the stability and character of the work throughout the institution depend largely upon permanency in the positions of the heads of departments. The College cannot afford, therefore, to allow professors who have acquired that wisdom and breadth of scholarship that come only from years of experience, and who have become thoroughly acquainted with the economic and other conditions throughout the State, to leave the College because of greater financial inducements offered by other institutions.

Carnegie Foundation for Advancement of Teaching.

The large financial rewards open to specialists in various business enterprises render it more and more difficult to retain strong men permanently in college work. As a means of attracting larger numbers to the teaching profession, and of encouraging those who are devoted to the work of education, Mr. Andrew Carnegie, in 1905, established the Carnegie Foundation for the Advancement of Teaching, by transferring to a body of trustees, $10,000,000 in five-percent bonds, the revenue from which should be used to provide retiring pensions to teachers in American colleges, universities, and technical schools. The following paragraph from Mr. Carnegie's letter to the men who had been selected as trustees indicates the general purpose in view in the establishment of this fund:

"I have reached the conclusion that the least rewarded of all the professions is that of the teacher in our higher educational institutions. New York City generously, and very wisely, provides retiring pensions for teachers in her public schools and also for her policemen. Very few indeed of our colleges are able to do so. The consequences are grievous. Able men hesitate to adopt teaching as a career, and many old professors whose places should be occupied by younger men, cannot retire."

The importance of the Foundation in promoting the advancement of higher education is very clearly set forth by President Pritchett in his first report to the Board of Trustees, wherein he says:

System of Retiring Allowances.

"It had for a long time prior to the establishment of this Foundation been evident that the time was approaching when, for the sake of education no less than the teacher, the remuneration of the teacher's calling must be increased. The teacher carries into his profession a large measure of devotion and finds his chief recompense in the work itself; but, in the long run, it is clear that the strong men will be attracted in diminishing numbers to this profession unless with the moral and intellectual reward there can be coupled at least stability of employment and protection against old age. Interested in this situation, and desiring to aid in a large and helpful way the whole body of American teachers, Mr. Andrew Carnegie decided to found an agency for providing in the higher institutions of learning in America a system of retirng allowances; and in doing this he had in mind not only the betterment of the teacher, the relief of men who find themselves helpless after long years of honorable work, the dignifying of the teacher's calling, but also the freshening of the work of the colleges themselves, by enabling them to put new men into the places of those whom old age or disability has rendered unfit for service."

The purpose of this Foundation, however, is not confined alone to the retirement of professors on pension. The certificate of incorporation provides that the particular objects of the corporation shall be to receive and maintain a fund, the income of which shall be, (1) "to provide retiring pensions, without regard to race, sect, creed, or color, for the teachers of universities, colleges, and technical schools in the United States, the Dominion of Canada, and Newfoundland;" (2) "to provide for the care and maintenance of the widows and families of the said teachers;" (3) "to make benefactions to charitable and educational institutions, and generally to promote the cause of science and education."

Purpose of the Foundation.

In the establishment of this fund Mr. Carnegie excluded from the beneficiaries thereof all state colleges, universities, and schools, on the assumption that the states would prefer to care for their own institutions. As explained by President Pritchett, however, in his report for 1908, Mr. Carnegie, on March 31 of this year, extended to these institutions the benefits of the Foundation, and increased the fund by an additional $5,000,000.

In the matter of pensions, the Foundation deals exclusively with institutions—not with individuals. The pensions are paid to the institutions from which the professors receive retiring allowances the same as the regular employees receive their salaries. Special emphasis is placed by the Foundation upon the payment of the pensions as a matter of *merit* and not of favor. As stated by Dr. Pritchett in a recent address, the Foundation stands today an educational agency—not a charitable institution. Since it has "to deal with education from the standpoint of a continent and not from the standpoint of an individual institution, or even from the standpoint of a great state," the Trustees have established certain standards as a means of determining eligibility to participation in the benefits of the endowment. Under the present regulations of the Board no institution can be-

Eligibility Requirements.

OREGON AGRICULTURAL COLLEGE

The State Legislature, which adjourned on Saturday, February 20, 1909, made the following appropriations to the Oregon Agricultural College for the two years, 1909-1910 and 1910-1911:

Maintenance—		
Continuing annual appropriation of $80,000		$ 160,000
(Being an increase of $30,000 a year.)		
Farmers' Institutes—		
Continuing annual appropriation of $2,500		5,000
Equipment and Improvements—		
$30,000 available for each of the two years		60,000
Buildings—		
Central Agricultural Building	$55,000	
Central Heating Plant	35,000	
Armory and Drill Hall	35,000	
Greenhouses	5,000	
		130,000
Land—		
$10,000 available each year		20,000
Total		$ 375,000
Experimental Work—		
Branch Station at Union	$15,000	
Branch Station at Hermiston	6,000	
Branch Station in Eastern Oregon for Dry-land Investigations	5,000	
		26,000
Total appropriated by Legislature		$ 401,000

As explained in the President's Report, the U. S. Department of Agriculture duplicates the amounts appropriated by the State Legislature for the maintenance of the station at Hermiston and of the station for dry-land investigations, making a total of $22,000 available for these stations, or a total of $37,000 for the three branch stations in Eastern Oregon.

The total income for the next biennium may be summarized as follows:

Maintenance—			
From State:			
General Maintenance	$160,000		
Farmers Institutes	5,000		
		$165,000	
From Federal Government:			
Interest land-grant, Morrill Act, 1862	23,000		
Morrill Act, 1890	50,000		
Nelson Act, 1907	35,000		
		108,000	
Student Fees:			
Entrance fees	15,000		
Shop and laboratory fees	22,000		
		37,000	
			$310,000
Buildings, Equipment, Land—			
Buildings	$130,000		
Equipment and Improvements	60,000		
Land	20,000		
			210,000
Total			$ 520,000
Experimental Work—			
From State:			
For Branch Stations		$ 26,000	
From Federal Government:			
Hatch Fund	$ 30,000		
Adams Fund	28,000		
For Branch Stations	11,000		
		69,000	95,000
Grand total			$ 615,000

come a beneficiary that does not articulate with the standard high school—that is, require for admission to its courses the completion in a standard high school of four years' work or its equivalent.

College Not Eligible.

It will be observed, therefore, that while the land-grant institutions as a class have become beneficiaries, the Oregon Agricultural College is not eligible to receive from the Carnegie Foundation retiring allowances for its professors, because this institution does not require the completion of the work of a standard four-year high school as a prerequisite for entrance upon its degree courses. However, notwithstanding the importance of the retiring pensions, very little consideration will show the impracticability of attempting to change the standard of the College merely for the sake of the pension system. The first obligation of the institution is to the State, and its policy must be determined by the educational conditions and the industrial requirements of the State.

BUILDINGS AND IMPROVEMENTS.

Waldo Hall.

The State Legislature in 1905 appropriated $65,000 for buildings; however, the appropriation was not available until 1907. It had been the intention of the Board of Regents to construct a woman's dormitory, with provision in the building for the work in Domestic Science and Art; and a drill hall for the department of Military Science and Tactics; but, during the interval between the time the appropriation was made and when it became available, prices had advanced to such an extent on all kinds of building material and on labor, and the cost of making the necessary sewer and water connections was so much greater than estimated, that it was found impossible to construct the two buildings as originally contemplated, and the entire amount was used for the woman's building. The contract was awarded early in 1907, and the building was completed in time for occupancy the following November, at a cost of about $76,000. It will be observed, therefore, that although the entire appropriation was used for this building, an additional $11,000 was required, and rather than to change the plans for the building this amount was advanced from the College miscellaneous funds. This building, which is known as Waldo Hall, is a substantial structure of concrete and brick, 96 feet by 240 feet, with three stories and basement. It contains 115 rooms for the accommodation of students, besides the kitchen, dining rooms, and parlors; and the office, laundry, and scientific laboratories for the work in Domestic Science and Art.

In 1907 the Legislature appropriated $65,000 for each of the years 1907 and 1908 for the construction and equipment of buildings. During the year 1907, plans were completed and a contract awarded for the Mechanic Arts building, or Shops, the Dairy Barn, and the Poultry Houses. The Mechanic Arts building is a modern structure constructed of brick with concrete foundation. It consists of a central part 52 feet by 52 feet, two stories in height, with a one-story wing on the east 40 feet by 220 feet; and another on the south 40 feet by 200 feet. The central portion, in addition to the offices, contains a drafting room, finishing room, tool rooms for the machine shop, a display room for students' work and toilet and locker rooms. The south wing contains a class room, a bench room, and a machine and storage room for woodwork, and the College printing plant; while in the east wing are the machine shop, the forge shop, and the room for the blast and exhaust fan and for the storage of coal and iron. The shops are all well lighted and provided with the most modern equipment. The benches, tables, cases, and other equipment of the woodworking shops were all designed and made by the department. This building was ready for occupancy on January first, but was not entirely completed until the summer of 1908. The cost of the building, with new equipment, was $52,000.

New Shops.

The new barn is one of the best buildings of the kind in the country, and cost $16,500. It is a frame building with brick pilasters and concrete foundation. The main part is 50 feet by 100 feet, two stories in height, with two wings extending to the south, each 46 feet by 80 feet, one story in height, and a small extension for a milk room and an engine room. It has accommodations for seventy cattle and nine horses, with a storage capacity on the second floor of 110 tons of hay. In addition to the horse stalls, the first floor of the main building contains grain bins, a seed room, and a room for vehicles. There is also storage room in the concrete basement for 100 tons of roots. The east wing has a concrete floor and is equipped with two large box stalls and with iron adjustable stalls for thirty cows. The isles are unusually wide for the convenience of students in their work with live stock. The west wing has a cement floor, but there were insufficient funds to provide the stall equipment. This wing is being used during the present year for work in agricultural mechanics. For want of funds it was impossible to have the walls of the barn finished on the inside, as provided in the plans and specifications.

Dairy Barn.

The Poultry buildings comprise an incubator house with a capacity of twenty-four incubators, and twenty-eight colony houses and brood coops. The colony and brooding houses are movable, and are constructed on a plan that could be adopted by farmers. These buildings are used for work of both investigation and instruction, and cost about $2,500. Part of the Poultry buildings were completed during the present year.

Poultry Building.

With the appropriation available in 1908 for buildings, the north wing of the proposed Agricultural Hall, known as the Agronomy building, has been constructed at a cost of $30,750, exclusive of equipment. On account of the difficulty in procuring material and workmen, the building was not completed and ready for acceptance until December 14th. It will be provided with sufficient equipment for use when the College opens after the Christmas holidays. This building is constructed of brick and concrete, and is 130 feet by 72 feet, three stories in height. It contains twenty-six laboratories, offices, and class rooms, and is eventually to be used entirely for agricultural work. At present, however, it is necessary to relieve the general congestion throughout the institution by using part of this building for other departments.

Agronomy Building.

In addition to these buildings, the building for the Young Men's and Young Women's Christian Associations, known as Shephard Hall, the foundation of which was built some years ago, is being completed and will be ready for occupancy on January 8th. This building will cost when completed about $21,000, without equipment. The entire cost of the building is being met by contributions from individual members of the Board of Regents, the faculty, the students of the College, and by prominent citizens of Oregon and other states. The building is 47 feet by 73 feet, three stories in height with basement. In the basement are the swimming pool, shower baths, lockers, and a banquet room. The first floor is devoted to a large room for reading, for social events, and for general assemblies; the Secretary's private and public office; a check room; a special room for the use of the Young Women's Christian Association; and a room to be used as an office for the student papers and the Athletic Association. The second floor contains six large rooms for the use of the student literary societies, while the third floor will be used at present for dormitory purposes. The completion of this building not only provides splendid facilities for the work of the Christian associations, but also relieves the congestion in other buildings by furnishing rooms for the different student organizations.

Shepard Hall.

In connection with the building operations of the past year, a general plan for the development of the institution has been carefully prepared, with such grouping and location of buildings as will best serve the interests of the different schools and departments, provision being made for such additions as may be needed from time to time as the growth of the College may require. A map has also been prepared by the department of Civil Engineering, with all buildings, sewer and pipe lines, and heating mains located; and with contour lines given showing the topography of the campus.

Other Improvements.

In addition to the completion of the new buildings, other important improvements have been made, making possible a re-adjustment of work that has greatly strengthened a number of departments. The removal of the machine and woodworking shops to the new Mechanic Arts building, vacated two large rooms in Mechanical Hall which were remodeled for an instrument room, a class room, and an office for the department of Civil Engineering; class rooms for Electrical and Mechanical Engineering; an Electrical laboratory, and a general engineering laboratory. The cost of these improvements was $1,141.

Cauthorn Hall, the men's dormitory, has been remodeled and provided with modern toilet rooms at a cost of $4,100. This building had been used for a great many years with practically no expenditures for repairs, except for outside painting, and its condition was such that the above expenditures could not be avoided, not only in preserving the building, but in making it fit for use.

The Administration building has been partly remodeled on the first and second floors, providing a reading room and stack rooms for the Library; offices for the Registrar; and a vault and rooms for the Business office and for the Book Store. The entire cost of the improvements in this building, including stacks for the Library, was $3,700.

The destruction of the old residence that had been used for the Pharmaceutical laboratory and class rooms, in order to make room for the new Mechanic Arts building, made it necessary to provide otherwise for the department of Pharmacy. On completion of Waldo Hall, the old dormitory for women—Alpha Hall—was vacated, and this building was remodeled and equipped for the work of this department at a cost of $1,600. This building also contains recitation rooms for some of the work in language and mathematics.

The one-story brick building that had been used for the work in blacksmithing until the completion of the new shops has been remodeled and provided with the necessary equipment for laboratory work in geology, mineralogy, and assaying, at a cost of approximately $1,950.

The large increase in the number of students pursuing the different courses in Chemistry, referred to in another part of this report, made it necessary to remodel the laboratory desks, provide additional drawers and cupboard space, and to make other changes in the arrangement of rooms, which, together, cost $750.

On account of the large number of students pursuing work in Physical Education, it has been impossible to provide adequately for this work. In order to make the best possible use of the available space, the bowling alleys have been removed and the rooms provided with lockers for the use of women as a dressing room. Additional lockers have also been provided for the men, and more adequate provision has been made for heating the water. The total cost of these improvements was about $1,200.

Old Barns Removed.

On completion of the new barn for the dairy herd and work in Animal Husbandry, the old barns were removed to a convenient place west of the new barn so as to get them entirely away from the men's dormitory and other school buildings, at a cost of about $750. These barns with a small additional expenditure for remodeling and repairing will provide feed stables and other room required for experimental work in live stock.

New Equipment.

Between $25,000 and $30,000 have also been expended during the two years for equipment, including the incidental equipment most needed by the general departments; physical and other apparatus required in the different scientific laboratories; fixtures for the department of Commerce; desks, tables, chairs, for the accounting room, the library, and the department of Domestic Art; and the necessary ranges, desks, gas fixtures, and other accessories for the Domestic Science laboratories.

ORGANIZATION.

In accordance with the action of the Board of Regents on July 17, 1907, definite plans were prepared during that year for the further development of the work throughout the institution, and a number of important changes were made in the organization of the several departments. The increase in the student attendance and the general growth of the College made it necessary to extend the organization and to provide for closer specialization. Accordingly the general department of Agriculture was abolished and in lieu thereof professorships were established in Agronomy, Animal Husbandry, Dairy Husbandry, and Poultry Husbandry, and a specialist was placed at the head of each of these departments. The work in veterinary science was temporarily provided for in the department of Animal Husbandry.

Segregation of Work.

The work in mathematics and civil engineering was segregated, Professor Skelton taking charge of the department of Civil Engineering and giving his entire time to this department; and Assistant Professor Johnson was promoted to a professorship and placed in charge of the department of Mathematics.

The work in Mechanical and Electrical Engineering was segregated, Professor Covell continuing in charge of Mechanical Engineering, and a professor being employed to take charge of the department of Electrical Engineering.

The departments of Chemistry, Pharmacy, and Mining, were also more fully organized. Professor Knisley, who had had general charge of all these departments, was relieved of the responsibility in connection with the work in Pharmacy and Mining and was made Professor of Agricultural Chemistry and Director of the chemical laboratories. Professor Fulton, who had divided his time between Chemistry and Mining, was made Professor of General and Analytical

Chemistry; Assistant Professor McKellips was made professor and placed in charge of the work in Pharmacy; and a Professor of Mining Engineering was employed to give his entire time to the work of this department.

Veterinary Science.

As explained in another part of this report, on account of the demand for special training in veterinary science in the development of the live stock interests of the state, the Board of Regents, at its meeting held in January, 1908, further segregated the agricultural work and established a professorship in veterinary science. For want of funds, however, with which to meet the expense, it was found necessary to postpone the employment of a professor to take charge of the veterinary department.

Schools Established.

A more thorough organization throughout the College was also authorized, as a means of securing a proper division of responsibility and of adding generally to the effectiveness and efficiency of the work. Schools were established in Agriculture, in Domestic Science and Art, in Engineering and Mechanic Arts, and in Commerce; and the instructional corps was organized into the Administrative Council, the College Council, and the Faculty. Each of the schools comprises all of the departments doing work along the different lines indicated by the name of the school.

Organization of Instructional Corps.

The Administrative Council consists of the President, the Director of the Experiment Station, and the deans of the different schools. The work of this Council is, for the most part, advisory, and relates to the larger questions of school and College policy. Through it the President has an organized ready means of keeping in close touch with the different schools and departments. The College Council comprises the President, the heads of all departments, the Registrar, and the Librarian. This organization may be regarded as the legislative body, its function being to consider questions relating to the educational work and policy of the College, to prescribe the requirements for admission and for graduation, and to act upon all applications for graduation. The Faculty is composed of the President, the Professors, the Assistant Professors, the Registrar, the Librarian, the Instructors, and the Assistants. The Faculty considers ordinary questions of method and discipline, and various matters relating to student activities and to the general interests of the College community.

In addition to the above organizations of the instructional force, there is the Experiment Station Staff, which includes the President of the College, the Director of the Experiment Station, and the heads of all station departments with their assistants. The duties of the Station Staff, as an organized body, relate to questions of method and policy in connection with the agricultural work of research and investigation.

The different departments throughout the institution have also been more fully organized, the respective functions of the professors, the assistant professors, and the instructors being clearly defined, with special emphasis upon professorial responsibility.

Methods of Business.

On the business side, a plan has been adopted whereby all expenditures are made under regulations which insure the best possible use of the available funds for the development of both the departmental and the general College interests. At the beginning of each fiscal year a budget is prepared apportioning the funds available for labor, equipment, and supplies, among the different schools and departments, which are required to keep strictly within the limits of their respective appropriations. Under this policy heads of departments know in advance the exact amount of money that may be expended during the year and can plan their work accordingly, thereby securing much better results than when expenditures are authorized at irregular intervals as present conditions may seem to warrant and require. All expenditures are made upon the requisition of heads of departments, approved by the President of the College, in accordance with the appropriations previously made by the Board of Regents.

It is required that all business of every kind whatever shall be transacted through the Business Office. A complete record is kept of all expenditures in the minutest detail, and a system of accounting has been adopted by which the condition of the different funds may be ascertained at any time.

Book Store Established.

At a meeting of the Board of Regents held on July 15, 1908, the College Book Store was established in connection with the Business Office, for the purpose of providing students with the books they require at the lowest possible cost. The Book Store is maintained without expense to the College, and books are being sold at a cost frequently as low as five per cent below the publishers' list price. Besides being a great saving to the students, it is also very convenient for them to be able to get their books at the institution as they may be needed.

CHANGES IN COURSES.

Standard Advanced.

At the meeting of the Board of Regents held on January 16, 1908, a number of important changes were also made in the courses of study. The standard was advanced one year, thereby making two years' work in a standard high school, or its equivalent, the prerequisite for admission to the degree courses. The Sub-Freshman, or preparatory, course was abolished and in lieu thereof Elementary Industrial courses were established in Agriculture, Forestry, Domestic Science and Art, Mechanic Arts, and Commerce. It was recognized that with only one year's work beyond the eighth grade required for admission to the regular college courses, it was impossible to adjust the work in these courses so that students could specialize to the extent necessary in meeting the requirements of the work for which they were preparing, or of the positions they may seek after leaving the institution. By raising the standard another year, the basic scientific work in the technical courses could be mostly completed during the freshman and sophomore years, making greater specialization possible during the remaining two years. A careful investigation of the conditions throughout the State led to the conviction that the courses of the College could be extended and strengthened without removing the advantages of the institution beyond the reach of those who desire and most need the training which it affords.

Courses Revised.

Opportunity for Specialization.

Advantage was taken of the opportunity given by the advancement of the standard for a thorough revision and coordination of the work throughout the institution. The distinctive work of the different courses was introduced into the freshman and sophomore years and was increased and continued through the junior and senior years. By this plan, students who are compelled to withdraw from the College at the end of one or two years will have had some work of a technical character that will be of practical value to them after leaving school. The courses in agriculture, especially, were very much strengthened through the differentiation of the different agricultural subjects. By completing the required introductory work in the different branches in agriculture during the first two years, the students are prepared at the beginning of the junior year to enter upon the advanced work of the particular line in which they may desire to specialize.

Sub-Freshman Course Abolished.

On account of the increase in the number of high schools in the State, and the improvement in their work, it was thought undesirable and unnecessary longer to continue the Sub-Freshman course, which consisted entirely of general preparatory work in such subjects as mathematics, history, English, etc. The abolishment of this course makes it impossible for persons to pursue at the College the general subjects only that are required for admission to the degree courses.

However, in advancing the standard of the College and abolishing the Sub-Freshman course, it was not intended that persons who desire an education along industrial lines that cannot be had elsewhere in the State, should be deprived of the advantages afforded by the College for technical training. The main purpose in the establishment of land-grant colleges was to provide in the several states for an education that should be adapted to the needs of the masses of the people. And in the development of the Oregon Agricultural College, consistent with the growth of the State and of the public school system, it is important that the institution shall be kept in touch with the people—that all of its work shall be so adjusted that it will best serve them. The most advanced work offered by the College is of the very greatest importance, and should be strengthened and developed in every way possible; but, as explained elsewhere in this report, this work, under present conditions, is beyond the reach of many of the people who are most in need of industrial training. There are still many districts in Oregon without high schools, and many others in which the high school work extends through only one or two years. None of the high schools offer courses in agriculture, and very few provide any work in manual training or in domestic arts. Yet the great majority of the people of the State are engaged in industrial pursuits. They are deprived of the advantages of higher education. They need vocational training—a knowledge of the things with which they are to deal in life.

Adaptation to Needs of People.

It was in response to this demand for work not provided for in other institutions that the Board of Regents established the Elementary Industrial courses, to which students are admitted from the common schools. These courses are strictly vocational, although as much time as possible is given to work in elementary science, and in mathematics, English, history, and drawing. Persons who complete the elementary courses, and who desire to take advanced work, may be admitted to any of the courses leading to degrees; but the

Elementary Industrial Courses.

main purpose is to give such knowledge and training as will be of the greatest possible value to those who do not continue their educational work. These courses, also, in connection with the department of Industrial Pedagogy, afford the training required to teach industrial subjects in the common schools. In each course, students are allowed to take the special subjects in which they have greatest individual interest. The work in Agriculture includes such subjects as soils and field crops, irrigation and drainage, dairying, live stock, fruit growing, fruit pests, and gardening; in Forestry, elementary work relating to the Forest Service, forest production and industries, and to the management of forest properties; in Domestic Science and Art, cooking, marketing, plain sewing, millinery, dressmaking, house sanitation, hygiene, and home nursing; in Commerce, stenography, typewriting, and accounting; and in Mechanic Arts, such handicrafts as carpentry, cabinet making, blacksmithing, machine work, foundry work, steam fitting, plumbing, and electrical construction.

INDUSTRIAL PEDAGOGY.

Professorship in Industrial Pedagogy.

To further assist in the promotion of industrial education, the Board of Regents established a professorship in Industrial Pedagogy. The demands throughout the State and country have rapidly increased during recent years for skilled mechanics and for men and women trained for special work in agriculture, and in home economics. As these demands have increased, it has been realized more and more that the system of public education, the work of which has been arranged in the common schools as a preparation for admission to the high schools, and in the high schools for admission to college, was not meeting the needs of the people, more than ninety per cent of whom are engaged in industrial occupations.

Public Schools Deficient.

This deficiency was not so apparent, or so important, during the earlier periods of the country's growth, when the economic and other conditions were such that there was little demand for experts. The schools gave the general training that all desired, and the special preparation required for the "learned professions." But, as civilization becomes more complex and the demands upon the individual increase, there must be a corresponding modification in the work of the schools if they are to discharge their true function of preparing for life.

Special Training Required.

The phenomenal growth of the country during the last few decades, with the concomitant aggregation of wealth in gigantic business and industrial enterprises, and the resultant centralization of population, has wrought such mighty changes in the business, industrial, and social world that it has become imperative that all who succeed must have special training for their work—no less in the industries than in the professions. There has been a remarkable development, it is true, in technical education of college grade—along all lines of engineering, agriculture, commerce, and household technology,—but not more than two per cent of the people are able to get this advanced training; while more than ninety per cent are engaged in the different industries.

Hence the importance of providing for industrial work in the public schools, so that the children who receive in them the only schooling they ever get may have the best possible training for the vocations which they are to follow in life. The value of such work, not only to the individual but to the nation, is very clearly stated in the following paragraph from an address delivered in Congress by Senator Nelson in support of his land-grant college bill, referred to later in this report:

> "Ere long the governments of the world will have expended hundreds of millions of dollars in building up a body of knowledge of agriculture and home making. Selections from this body of practical facts woven in with the literary and general subject-matter of our rural school course will

give life to these primary rural schools, which are not now apace with modern progress. Nothing short of the highly developed, so-called consolidated rural schools with specially trained teachers can take the rich and interesting technical education to all the boys and girls who live on the farm. *This education so increases the productive capacity of the farm youth that from this standpoint alone it will pay its own cost several times over—with better homes, better rural civilization.* * * * The welfare of the future fathers and mothers in our farm homes, as well as the welfare of our country as a whole, demands that our farm youth be better schooled both in technique and in the general subjects."

Value of Industrial Education.

Many states are introducing industrial work into the common and high schools, but the progress being made in this direction is unavoidably slow, due in part to the expense involved, but mostly to the lack of teachers who are trained for the work. This is particularly true of agriculture. While the agricultural work given in the common schools must of necessity be elementary, yet this work requires a knowledge of the scientific principles governing plant and animal life, and of the applications of these principles in agricultural practice.

Demand for Trained Teachers.

As stated by Dean Bailey of the New York College of Agriculture, in his report for 1907:

"Probably the most far-reaching educational movement now in progress is the effort to adapt the rural schools to the needs of the people. One of the great obstacles to the progress of this effort is the almost total lack of teachers who have either any knowledge of the needs of the people or a definite outlook to the work. There is great danger that the present interest in agricultural education may collapse, as similar but smaller previous movements have collapsed, unless a very active effort is made to train teachers for the work. These teachers must be trained in agricultural colleges. At Cornell we already have a beginning for the training of such teachers in our two-year nature-study course."

Dean Bailey's View.

The United States Commissioner of Education, in his report for 1905, emphasizes the importance of providing in the colleges of agriculture and mechanic arts for the training of teachers to give instruction in agriculture and related subjects. He says:

Commissioner Brown.

"If the subject of agriculture is to be introduced into the common schools throughout the country there should be at least one place in each state where teachers may be trained to give such instruction. The 'land-grant colleges' are undoubtedly better equipped than any other class of institutions to provide such instruction. It might be well, therefore, if additional funds are to be granted to them by the General Government, to provide that part of such funds be available for the training of teachers for the schools where elementary agriculture and related subjects are included in the course of study, particularly of teachers of agricultural subjects in high schools and state normal schools."

In accordance with this view, the Nelson Bill, which was then pending in Congress and was passed two years later, making additional appropriations to the land-grant institutions, under the terms of the Morrill Act of 1890, specially provides—

"That said colleges may use a portion of this money for providing courses for the special preparation of instructors for teaching the elements of agriculture and the mechanic arts."

In the meantime there had been such active interest in the matter of introducing agriculture into the public schools, with comparatively little effort being made to train teachers for the work, that Dr. Brown, United States Commissioner of Education, expresses his anxiety regarding the success of the movement in the following communication, dated April 9, 1907:

"I am very much concerned with reference to the danger which I foresee of a painful shortage of teachers of agriculture. You well know that we are just now on a wave, and apparently a rising wave, of interest in agricultural education. Seven states have already provided for agricultural high schools; ten states have made provision, by law, within a very few years, for the teaching of agriculture in the elementary schools; in nine states bills have been pending in the legislatures of the present year, providing for the extension of such teaching. At the same time there is no extensive provision making for the training of teachers for such schools. The schools simply cannot be made without the teachers. The only thing we can expect from such a state of affairs is that this rising wave will, in a few years, become a sharply receding wave; for the public will not continue to take this lively interest in agricultural education of elementary and secondary grade if they find that the subject of agriculture is much more badly taught than the other subjects in the schools.

Agricultural Colleges Should Train Teachers.

"I am extremely desirous of seeing everything done that can be done to avert this danger, and to hold these recent gains for agricultural education, which seem to me in the nature of real gains for our national education. It is fortunate that just at this time the Nelson amendment to the last appropriation bill has made permissive provision for the training of teachers at the agricultural and mechanical colleges. A portion of the new funds, which amounts to five thousand dollars for each state the first year with a cumulative addition of five thousand dollars in each of the four following years, may be used for the training of teachers.*

It was in response to this demand for the preparation of teachers for industrial work in the public schools that the Board of Regents took advantage of the opportunity afforded by the Nelson Act in establishing the department of Industrial Pedagogy. As already observed, the Federal appropriation, under a provision of the Nelson Act, is available for the maintenance of this department. In this work provision is made for two classes of teachers: First, those who are to teach in normal schools, high schools, and other institutions of secondary or college grade; and, second, those who are to teach in the common schools of both the city and the rural districts. The technical training required for teachers of the first class may be had in the regular college

Professorship Established in Industrial Pedagogy.

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*This communication is taken from the President's Report of Cornell University for 1907.

courses leading to degrees, provision being made for the special pedagogical work in the department of Industrial Pedagogy. It is not necessary, however, that teachers in the common schools should be college graduates. The work they require is of a more elementary character and can be had in one or two years of the Elementary Industrial courses.

After industrial work is provided for in the normal and high schools of the State, and placed in charge of competent instructors, these schools will then be able to give the special training required by those who expect to teach industrial subjects in the common schools.

Summer School for Teachers.

In July, 1907, the Board of Regents authorized the organization of a course in agriculture to be offered during the summer vacation, in order that the teachers of the State might receive some special preparation for the use of the agricultural book which had been adopted for the seventh and eighth grades of the public schools. On account of the general demand referred to above for work in other industrial subjects, and the establishment of the department of Industrial Pedagogy, made possible by the passage of the Nelson Act, it is planned to have the work of this school cover a much broader field and extend over a period of five or six weeks. The pedagogical work will be in charge of the Professor of Industrial Pedagogy and others who might be employed to assist; while the technical work in the different subjects of agriculture, forestry, domestic science, commerce, and mechanic arts, will be given by the professors in charge of these departments of the College. The work of this school will be of special value to teachers who are unable to attend the College through the school year, but who desire to begin industrial work in their schools. It is planned also to give the teachers in the county institutes as much assistance as possible in this work. By these different agencies, it is expected that the College will be able to render very valuable service in extending the advantages of industrial education.

PURPOSE AND SCOPE.

Notwithstanding the fact that it has now been more than forty-five years since Congress took the initiative in providing for the establishment of the agricultural and mechanical colleges, there is still a lack on the part of a great many people of a perfect understanding in regard to the function and scope of these institutions, and their relation to the Federal and State governments. It is not thought inappropriate, therefore, at this time, to direct attention to some of these matters in connection with a consideration of the work and policy of the Oregon Agricultural College.

Organic Act of 1862.

This institution was established by the State Legislature in 1868 in pursuance of an Act of Congress, approved by President Lincoln on July 2, 1862, granting public lands to the different states and territories for the endowment of colleges of agriculture and mechanic arts. Section four of this Act provides that the income from the sale of the lands appropriated should constitute a perpetual fund, the income of which should be inviolably appropriated by each state—

"To the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

Section five of the same Act provides that—

"No portion of said fund, nor the interest thereon, shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation, or repair of any building or buildings."

State Laws.

The State Legislature in establishing the College accepted the provisions and conditions of this Act of Congress and pledged the faith of the State to carry the same into effect. Section two of the Act of the Legislature of 1868 provides that—

"The students * * * shall be instructed in all the arts, sciences, and other studies, in accordance with the requirements of the Act of Congress making such donation."

Again, in Section one of the laws of 1870, it is provided that the—

"Students * * * shall be instructed in accordance with the requirements of the Act of Congress approved July 2, 1862, granting public lands to the several states and territories which might provide colleges for the benefit of agriculture and the mechanic arts, and the acts amendatory thereof."

Morrill Act of 1890.

The supplementary Act of Congress, approved August 30, 1890, for the more complete endowment and support of the land-grant colleges, provides an annual appropriation of $25,000 to—

"Be applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematical, physical, natural and economic science, with special reference to their applications in the industries of life, and to the facilities for such instruction."

The Act of Congress making appropriations for the United States Department of Agriculture for the fiscal year ending June 30, 1908, approved March 4, 1907, contained what is known as the Nelson Amendment—which was a bill then pending in Congress providing for the further endowment of land-grant institutions, but was inserted as an amendment to the Agricultural Bill as a means of securing its passage at that time. Under this amendment there is annually appropriated—

Nelson Amendment.

"For the more complete endowment and maintenance of agricultural colleges now established, or which may hereafter be established, in accordance with the Act of Congress approved July 2, 1862, and the Act of Congress approved August 30, 1890, the sum of five thousand dollars, in addition to the sums named in the said act, for the fiscal year ending June 30, 1908, and an annual increase of the amount of such appropriation thereafter for four years by an additional sum of five thousand dollars over the preceding year. * * * The expenditure of the said money shall be governed in all respects by the provisions of the said act of Congress approved July 2, 1862, and the said act of Congress approved August 30, 1890; *Provided,* That said colleges may use a portion of this money for providing courses for the special preparation of instructors for teaching the elements of agriculture and the mechanic arts."

It will be observed that the appropriations under the Nelson Act are available for all the purposes specified in the Morrill acts, with the proviso only that part of the funds may be used for the training of teachers.

The different Congressional acts are administered on behalf of the Federal Government by the Department of the Interior. As interpreted by the Department, in accordance with the decisions of the Attorney General, the funds accruing from these acts cannot be used for the purchase of land, or for the purchase, erection, or maintenance of buildings; for the payment of the salaries of administrative officers, or of instructors in any subjects not specified, such as history, psychology, and the languages, except English; or for the purchase of furniture, cases, desks, or other similar articles of equipment. It was expected by Congress that these funds should constitute only part of what would be needed, as an assistance and encouragement to the several States in providing such institutions as may be required for the proper education of the "industrial classes." As explained by Dr. Blackmar, in his History of Federal and State Aid to Higher Education,

Obligation of State.

"The Federal Government intended the grant should form a nucleus in each of the several states around which buildings, libraries, laboratories, workshops, gymnasiums, military halls, and other educational appliances should be grouped by means of public munificence and state bounty. It was to prove a stimulus to the generosity of the people and the liberality of the states."

The extent and character of the work for which the Federal appropriations are available are clearly indicated in the following classification of subjects included under the Act of 1862 and the supplementary Act of 1890, given in an official communication of the United States Commissioner of Education, approved by the Secretary of the Interior on December 7, 1900:

Subjects Classified.

"*Instruction in Agriculture.*—(1) Agriculture, (2) Horticulture, (3) Forestry, (4) Agronomy, (5) Animal Husbandry, (6) Dairying, (7) Veterinary Science, (8) Poultry Industry, (9) Apiculture.

"*Instruction in Mechanic Arts.*—(1) Mechanical Engineering, (2) Civil Engineering, (3) Electrical Engineering, (4) Irrigation Engineering, (5) Mining Engineering, (6) Marine Engineering, (7) Railway Engineering, (8) Experimental Engineering, (9) Textile Industry, (10) Architecture, (11) Machine Design, (12) Mechanical Drawing, (13) Ceramics, (14) Stenography, (15) Typewriting, (16) Telegraphy, (17) Printing, (18) Shop Work.

"*Instruction in English Language.*—(1) English Language, (2) English Literature, (3) Composition, (4) Rhetoric, (5) Oratory.

"*Instruction in Mathematical Sciences.*—(1) Mathematics, (2) Bookkeeping, (3) Astronomy.

"*Instruction in Natural and Physical Sciences.*—(1) Chemistry, (2) Physics, (3) Biology, (4) Botany, (5) Zoology, (6) Geology, (7) Mineralogy, (8) Metallurgy, (9) Entomology, (10) Physiology, (11) Bacteriology, (12) Pharmacy, (13) Physical Geography, (14) Meterology.

"*Instruction in Economic Sciences.*—(1) Political Economy, (2) Domestic Economy, (3) Commercial Geography."

Experimental Work Required.

After a number of different states had established colleges under the land-grant, many difficulties were encountered in the development of the agricultural work in these institutions. This was partially due to the lack of trained teachers for the work, but largely to the deficiency of knowledge of the scientific principles underlying agricultural practice. The Morrill Act of 1862 related to the work of instruction only, or to the dissemination of knowledge. No provision was made for experimental or research work for the purpose of discovering new truths or of determining an effective means of applying the principles already understood. In order, therefore, "to promote scientific investigation and experiment regarding the principles and applications of agricultural science," Congress passed what is known as the Hatch Act, approved March 2, 1887, appropriating $15,000 annually for the maintenance of an agricultural experiment station in each of the land-grant colleges. Section two of this Act provides—

Hatch Act 1887.

"That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with the remedies of the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under the varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective States and Territories."

On March 16, 1906, Congress passed an Act for the further endowment of the experiment stations. This Act makes an appropriation to each state and territory, which will eventually amount of $15,000 annually,

Adams Act 1906.

"To be applied only to paying the necessary expenses of conducting original researches or experiments bearing directly upon the agricultural industry of the United States, having due regard to the varying conditions and needs of the respective states and territories."

The administration of this Act, known as the Adams Act, is placed in the hands of the Secretary of Agriculture, who has ruled that—

"Expenses for administration, care of buildings and grounds, insurance, office furniture and fittings, general maintenance of station farm and animals * * * and other general expenses for the maintenance of the experiment station, are not to be charged to this fund. This Act makes no provision for printing or for the distribution of publications, which should be charged to other funds."

Necessity For State Support.

"The increased liberality of the Federal Government," says Secretary Wilson, "in providing for the endowment of research and experimentation in agriculture should be a further incentive to the States and local communities to supplement these funds for the extension of demonstration experiments, farmers' institutes, agricultural colleges, schools, and courses of instruction, and the general education of the rural communities along industrial lines, in order that the masses of our farmers may be so educated from early youth that they will appreciate the benefits of original research and experimentation as applied to agricultural problems, and be able to appropriate in the most effective manner for their own benefit and the general welfare of the nation whatever practical results are obtained from the work of the agricultural experiment stations."

Field of Agricultural College Work.

From a careful examination of the organic act of 1862, and the acts supplementary thereto, it is evident that the work of the land-grant colleges should cover a broad field, including the different subjects of applied science and the general training that constitutes an essential part of a liberal education. As stated by Senator Justin S. Morrill, author of the acts of 1862 and of 1890:

"The object of the Act of 1862 was to give a chance to the industrial classes of the country to obtain a liberal education, something more than was bestowed by our universities and colleges in general, which seemed to be based more on the English plan of giving education only to what might be called the professional classes—in law, medicine and theology." The fundamental idea was "to offer an opportunity in every state for a liberal and larger education for larger numbers; not merely to those destined to sedentary professions, but to those much needing higher instruction for the world's business, for the industrial pursuits and professions of life."

The general purpose in view, therefore, in the establishment of the colleges of agriculture and mechanic arts was to promote the *liberal* and *practical* education, primarily of the industrial classes—to apply science in the industries of life. The laws under which these institutions are maintained place special emphasis on the technical or distinctive work along the different lines of agriculture, the mechanic arts, commerce, and home economics, as well as the related subjects of mathematics and the natural and physical sciences. Classical subjects are not excluded, and military tactics is required. The subjects that constitute an essential part of the *liberal* education contemplated in the organic act, include sufficient English to give a reasonable degree of accuracy and facility in the use of the mother tongue and some appreciation of standard literature; the history and political science necessary for a comprehensive understanding of the origin and development of industrial, political, and social institutions; and such knowledge of modern language as may be needed to keep in touch with the scientific development of at least one foreign country.

Subjects of Liberal Education.

The classification of the distinctive technical work provided for in the Morrill Act includes, in Agriculture, such subjects as agronomy, horticulture, animal husbandry, forestry, dairying, poultry husbandry, veterinary science, and apiculture; in Mechanic Arts, the different lines of engineering—mechanical, civil, irrigation, electrical, mining, experimental,—besides architecture, machine design, mechanical drawing, shop work, printing; in Domestic Science and Art, the various subjects of cookery, home sanitation, household art, dressmaking, millinery; and in Commerce, such subjects as trade and transportation, business administration, production and manufacture, business organization and management, accountancy, stenography, and typewriting.

Distinctive Technical Work.

It will be observed that the terms of the organic act are definite and positive in regard to the character of the institutions that would fulfill the objects of the law, but are sufficiently broad to permit such modification in matters of detail as may be required to meet the varying needs of the rapidly growing country. At the time of the passage of the second Morrill Act, however, the economic and other conditions throughout the United States were such that, with the crystalization of policy in the management of these institutions that had resulted from the experiences of the preceding two decades, it was possible to specify the work more in detail, even to the extent of naming the subjects, that should be provided for by the funds accruing from the Federal appropriations.

Inter-dependence of Technical Courses.

A careful consideration of the subject of technical education, and of its importance in conserving and developing the natural resources of the country, will show that the entire plan of land-grant college work is most ideal and comprehensive, including the subjects required in training for good citizenship, as well as for industrial efficiency in any of the great fields of production, manufacture, and commerce. There is a vital inter-dependence of the agricultural, engineering, commercial, and other distinctive work, that makes for unity, efficiency, and mutual helpfulness. The development of agriculture depends not only upon the application of scientific principles in the production of crops, but also upon a demand for farm products, and an easy and economic means of transporting them to market. Under present conditions, adequate transportation facilities constitute a most essential factor in the growth of agriculture. An increase in transportation facilities, by the improvement of highways and inland waterways, and by the extension of railroads, must precede, or accompany, any great agricultural advancement. Other important factors are the construction of factories for the manufacture of the most improved farm machinery

Development of Agriculture.

and implements, and of the different articles made from the products of the farm; the utilization of water power for manufacturing and transportation; and the manufacture of structural steel and cement used in building cities, thereby increasing the demand for farm products. On the other hand, there can be no great progress in building factories, railroads, and cities, except through a corresponding development of agriculture and forestry. Factories must have the raw material required, and a market for their products;* transportation lines go only where the movement of commodities warrants; while the growth of most cities at least is dependent alike upon the prosperity of both the farmer and the manufacturer. Then, again, the combined efforts of engineers and agricultural experts are required in the drainage of swamp lands, and in the reclamation of large arid tracts by irrigation; while success in any modern enterprise is possible only through the application of business principles. Special training in business methods is as essential in agriculture, in manufacturing, and in transportation, as it is in merchandising. Moreover, the prosperity and civilization of a country depend upon the character of its homes, and the modern home requires special training in the sciences and arts relating to home life.

Factories, Railroads, Cities.

Business Principles Applied.

Furthermore, aside from the economic value of land-grant college work in promoting state and national development, the subjects which are comprised in the curricula of these institutions have the greatest possible educational or disciplinary value. While it has not been many decades since the classics and the pure sciences were regarded as the only subjects for mind training, it is now fully recognized that the applied sciences, which combine thinking with doing, taught by competent instructors, with suitable equipment,

Disciplinary Value.

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*Agricultural products constitute 42 per cent of all materials employed in manufacturing in the United States.—Year Book, Department of Agriculture, 1905, page 15.

have a disciplinary value not surpassed, if equaled, by the old style college course.

It is apparent, therefore, that, considered from all points of view, the different courses in agriculture, engineering, commerce, and household technology, maintained co-ordinately as the distinctive features of land-grant college work, together with the related scientific and general subjects, constitute a unity and completeness of educational endeavor peculiarly adapted to the needs of American industry and of American life.

Land-grant College Statistics.

There are sixty-five land-grant institutions. Each State and Territory, except Alaska, has at least one, while sixteen Southern States maintain separate schools for colored persons. In 1907, as reported by the Office of Experiment Stations, U. S. Department of Agriculture, these institutions had permanent funds and equipment aggregating in value $96,234,000; and an income for that year, exclusive of experiment stations, of $14,560,000. Of this income, $2,073,000 was received from the Federal Government under the acts of 1862 and 1890, and $7,844,000 from the several States, the remaining $4,643,000 being the interest from endowments, and the amounts received in student fees and from miscellaneous sources. The value of the permanent endowment and equipment is increasing at the rate of about $5,250,000 a year. The number of professors and other instructors in the colleges and universities for white persons was 5,145, and of students 59,485. The total number of students in agriculture was 9,777; in engineering and mechanic arts, 16,999; in domestic science and art, 1,597. Of these, there were in the degree courses in agriculture, 4,138; in engineering, 16,330; in household economy, 1,047; and in the short courses not leading to degrees, in agriculture, 5,639; in mechanic arts, 669; in domestic arts, 550. The number of men in military tactics was 16,048.

The experiment stations had an income of $2,235,000, of which $1,056,000 was received from the Federal Government, $770,000 from the different States, and the balance from miscellaneous sources. They employed 1,098 persons, of whom 484 did work as teachers in the colleges with which the stations were connected.

In connection with the above, it is interesting to note that in 1896-1897, the number of professors and instructors in the faculties of the institutions for white persons was 1,472, and the number of students 25,069; while the aggregate value of permanent endowments and equipment was $51,275,000, and the income for the year from all sources was $5,178,000, of which $1,620,000 was received from the National Government. The total revenue of the experiment stations for the same year was $1,130,000, of which $720,000 was received from the United States under the Hatch Act.

While the colleges of agriculture and mechanic arts made comparatively slow growth during the first two or three decades, the development of these institutions during the past ten or fifteen years has been most remarkable, not only in the work directly accomplished along technical lines, but also in the influence they have exercised in shaping the general educational policy of the country. As stated by Senator Nelson in advocacy of the passage of the Nelson Bill, previously referred to in this report,

The Old and New Education.

"It is not too much to say that through the Morrill Act of 1862 and subsequent acts, Congress has wrought a revolution in American education as well as in American agriculture. The old educational ideals * * * have slowly given way to the far broader ideals for a system of public education suited to the needs alike of workers, business men, home makers, technicians, and professionals. The new education while retaining the high moral and ethical ideals of the old, combines with these substantial training in doing the things of every day life."

As an indication of the directions in which the agricultural colleges have been developing, of the work they have already accomplished, and of their importance in promoting both national and state interests, Senator Nelson is further quoted as follows:

Agriculture Developed.

"The agricultural departments of our State colleges are recently having a most substantial development, and from them is springing a brood of agricultural high schools and a still larger brood of consolidated rural schools. * * * These courses have become so universally successful that even conservative educators of the old school acknowledge that the new education initiated by Congress in 1862 is destined to revolutionize country life and the rural industries.

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Importance of Engineering.

"These land-grant colleges have influenced the non-agricultural industries to nearly as great a degree as they have improved agriculture. The engineering courses in these colleges have supplied a large share of the men who have made it possible to develop our vast systems of transportation and manufacturing and to erect our great cities. They have provided a large body of teachers of the science and technique of the industries and of home economics for the other schools. They are the forerunners of the city mechanic arts high school, and of the introduction of industrial and manual training subjects into city grade schools. * * * The degree to which we, as a nation, shall distance other nations in manufacture, if not indeed in the development of transportation and in the erection of cities, will in no small part depend upon the rounding out of the technical education of those who are to work in our mechanical industries. The use of federal funds to enable the engineering departments of our land-grant colleges to lead onward and upward in this educational movement has in every way proved justifiable.

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Home Economics.

"These same colleges have also done the country a pronounced service in inaugurating instruction in home economics. This relatively inexpensive line of teaching is now rapidly extending from the State colleges into all other colleges, secondary schools, and primary schools wherever girls are taught separately or in co-educational institutions. This one line of instruction alone is of vastly greater value than the total cost to the nation and States of all these colleges.

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"We have no institutions better adapted to build up true American citizenship than our agricultural and mechanical colleges, where literary, ethical, scientific, industrial, and military training are blended into a strong, sensible, inspirational scheme of education. Congress did wisely in establishing them, and as this great nation grows in power and in wealth it should further recognize them and build them up."

Function and Scope of O. A. C.

In this great work of industrial education, the Oregon Agricultural College is in harmony with the spirit and policy of the best land-grant institutions of the country. Its function and scope are clearly indicated in the provisions of the Federal and State laws under which it is maintained. It is the purpose of the College to meet the needs of the people for a "liberal and practical education," and to promote the development of the varied resources and industries of the state.

Courses Offered.

The College offers the following courses: Degree courses in Agriculture, Forestry, Domestic Science and Art, Civil Engineering, Electrical Engineering, Mechanical Engineering, Mining Engineering, Commerce, and Pharmacy, each extending through four years; elementary industrial courses in Agriculture, Forestry, Domestic Science and Art, and Commerce, each extending through two years; winter courses in General Agriculture, Dairying, Horticulture, Mechanic Arts, Surveying and Road Construction, and Domestic Science and Art; a summer course for teachers, extending through six weeks; and courses in Music, including voice, piano, violin, stringed instruments, and band.

AGRICULTURE.

As explained elsewhere in this report, under Organization and Changes in Courses, the agricultural work of the College has been extended and very much improved during the past two years. The departments of Agronomy, Animal

Husbandry, Dairy Husbandry, Horticulture, Poultry Husbandry, and Entomology, are now maintained with a full complement of professors, instructors, and assistants. The department of Veterinary Science has been established, but for lack of funds has not been organized. The progress that has been made in the development of the agricultural work, the courses offered, the increase in the number of students pursuing the different subjects, the present conditions, and the requirements for the next biennium, are given in detail in the Appendices.

School Statistics.

As shown in the report of Dean Cordley, the total enrollment of students in Agriculture for 1906-1907 was 136, of whom 80 were in the degree course and 56 in the short winter courses. All of the instruction was given by three men whose time was largely required in the work of the Experiment Station and of the farmers' institutes. Of the 285 term credits necessary for graduation from the regular course, only 40 credits, or 14 per cent, were required in agricultural subjects. In 1907-1908 two professors and one instructor were employed, increasing the teaching force from three to six. The attendance for this year had increased to 179, exclusive of the summer school students in Agriculture. Of these, 109 were in the regular work of college grade, and 70 were in the short winter courses. The number of courses were increased from 10 to 50, and the number of term credits from 40 to 169, the proportion of the agricultural work in the degree course being increased from 14 per cent to 51 per cent.

Instructors and Courses Increased.

Up to December 1, 1908, the number of students registered for the regular work exceeded by more than 53 per cent the total registration for the same work of the preceding year. During the present year, the instructing force has been increased from six to ten. There are offered a total of 83 courses in agricultural subjects, aggregating 243 semester credits. Sixty-eight of the 144 semester credits required for graduation from the course in Agriculture, or approximately 57 per cent, may be taken in agricultural subjects.

Phenomenal Growth.

It will be observed, therefore, that the increase in the number of students pursuing regular agricultural work in 1907-1908 over 1906-1907 was 36 per cent; and on December 1, 1908, the enrollment was 53 per cent over 1907-1908, and 111 per cent over 1906-1907. It will also be observed that the increase in the actual amount of agricultural work given has been far greater even than the increase in attendance, the increase in the work offered for 1907-1908 being 400 per cent over the preceding year; and for 1908-1909, upwards of 900 per cent. Besides the increase in the number of agricultural subjects given, it may be noted that there has also been a large increase in the amount of work offered in the basic subjects of bacteriology, botany, physics, chemistry, and zoology. These figures show a growth that is without parallel, so far as known, in the development of agricultural education in this country.

In order to insure efficient work in the various departments of Agriculture, particularly in view of the large increase that will undoubtedly continue in the number of students pursuing agricultural subjects, it will be necessary to provide for a number of additional instructors, for more extended equipment, and for additional room. As stated by Dean Cordley, in his report to the President:

> "Notwithstanding the fact that the instructing force in Agriculture has been increased during the biennium from three to ten persons, and that to the facilities for instruction have been added a well equipped poultry plant, a splendid agronomy building which contains some of the best equipped laboratories for work in agronomy to be found in the country, and an attractive and well equipped dairy barn, the increase in the facilities for instruction has not kept pace with the development of the work. The room available for instruction purposes has approximately doubled, the teaching force has trebled, while the amount of instruction given has increased nine-fold."

Department of Agronomy.

The department of Agronomy offers fourteen courses, including the different subjects of soils, crops, irrigation and drainage, farm mechanics, and farm management. The work of this department, therefore, covers a broad field, and is fundamental to a large part of the work of the other agricultural departments. In addition to the advanced work elected by those who desire to specialize in agronomy, general elementary courses are required in the Freshman and Sophomore years of all students in the course in Agriculture. During the present year, 13 different courses are being given in seventeen sections, aggregating 47 semester hours, with a total of 323 class units. All this work is given by the Professor and one instructor, who also devote a large part of their time to the work of the Experiment Station and the farmers' institutes. With the increase in the amount of work required in Agronomy, it will be necessary next year to employ at least one additional instructor. The new Agronomy building contains the necessary laboratories, class rooms, and offices for the work of this department, except in agricultural mechanics. This work is now being given in the west wing of the new barn; but, as the work in Dairy and Animal Husbandry increases, all of the room in the barn will be required for these departments, when other arrangements will have to be made for the work in agricultural mechanics. For this work, upwards of $5,000 worth of the most modern farm machinery has been loaned to the department by different dealers or manufacturers; and, as explained by Professor Scudder, as soon as adequate provision is made for its care, at least "$10,000 worth of such machinery can be secured at no cost to the institution, making the equipment of this department superior to that of any other institution west of Missouri, and equal to that of any other in the country." Some additional equipment will be required for the other subjects in Agronomy as listed in the Depart-

Farm Mechanics.

mental Estimates of Requirements, given in the Appendices.

The department of Horticulture is one of the largest and most important agricultural departments of the institution. It is now offering 33 different courses, covering the entire field of general horticulture, floriculture, and vegetable gardening. In addition to the winter-course work, 12 different courses were given during the year 1907-1908, with a total of 266 students in all of the classes. The work and the number of students for the present year are about 50 per cent greater than for the preceding year, and it is estimated by Professor Lewis that during the next biennium 28 different courses will be given with a total class registration of 475 and 660 for the first and second years respectively. If Mr. Bouquet, who is now on leave of absence, should resume his work at the College at the beginning of next year, the instructional force will be sufficient. But this department is practically without room for its work. At present it is using the small frame structure near the power plant, which is not only unsuitable for the work, but is entirely inadequate, having scarcely sufficient room for the offices. The small glass houses adjoining this building are not large enough to meet the demands of the campus. For the laboratory work along certain lines of horticulture, extensive greenhouses are required. There should also be storage rooms, pomological laboratory, grafting laboratory, general laboratory, spraying laboratory, station laboratory, drafting room, photographic room, and rooms for the horticultural museum, and the herbarium; besides offices for both the instructional and the station work, and class rooms for the different instructors.

Department of Horticulture.

Additional Room Required.

The growth and importance of the department of Horticulture, make it necessary that provision be made at once for the construction of a suitable building for this department. The general plan of the new agricultural building, submitted to the Board of Regents at its meeting last January, provides for the use of the south wing for the horticultural work. The building, 72 feet by 140 feet, three stories in height, would contain the room required for the work in Horticulture, and, temporarily, some additional room that could be used by other departments. It is planned to have the greenhouses extend south of the horticultural building; and, by providing for the use of the land near by for the floricultural and vegetable gardens, an ideal plan can be carried out for the development of the horticultural work. As soon as practicable it is also important that additional land be procured for both the instructional and the experimental work in horticulture. On this subject, Professor Lewis says:

Horticultural Building.

"More land is sorely needed by the Horticultural department. At the present time our permanent land consists of only five acres. This, I believe, is the smallest area for horticultural purposes used by any college or station in the United States. Hardly any station that is doing horticultural work at all has less than thirty acres for such purposes. It would be very desirable to buy the Meeker property, which would give us an orchard in full bearing and also land for the starting of new orchards along commercial lines. In addition to this, a small piece of land should be set aside near the horticultural building to be used as floricultural and vegetable gardens for class purposes, and land for growing stock plants for greenhouses."

More Land Needed.

There has been a large increase in the amount of work called for during the past two years in the different subjects of Animal Husbandry, and in the number of students pursuing work in this department. It is estimated that for the next biennium the number of credit hours will average about 56, and that the number of students taking the regular work will reach at least 200. This will make it necessary to provide another instructor, additional equipment, and more room. As reported by Dr. Withycombe:

Animal Husbandry.

"The real needs of the department are, first, more first-class live stock; second, for the years 1909 and 1910 additional class room and another instructor; third, a judging pavilion. This last expense can be deferred for a time, but such a building would greatly add to the convenience and attractiveness of the work. By far the greatest present need is more live stock. The College and Station has a good herd of Jerseys and Shorthorns, Yorkshire and Berkshire swine, and a good flock of Cotswold and Shropshire sheep. But for thorough work in animal husbandry there should be a greater number of breeds represented so that students can have a much wider range of work and thus become familiar with practically all of the leading breeds of live stock."

Live Stock Needed.

Eleven different courses are now offered in Dairy Husbandry. With the growth of the dairy industry of the state, there has been a corresponding increase in the interest taken in the work of this department of the College. To take care of the work, it has been necessary to employ an additional instructor for the second semester of the present year, and still further assistance will be required during the next biennium. Dairying is one of the leading agricultural industries of the state; but, with the climatic and other local conditions so favorable, the growth of this industry should be much more rapid in the future than it has been in the past. Before there can be any very great development, however, it is necessary that the dairymen follow more up-to-date scientific methods in their work. In proportion to the extent that they do this will the supply of milk, butter, and cheese be increased. Secretary Wilson of the U. S. Department of Agriculture estimates that "one-fourth of the cows of the country do not pay for their feed, and more than half of them do not return any profit." Before the dairy industry can be placed on a stable, profitable basis, the dairymen must eliminate the unprofitable animals from their herds. This is not impossible of accomplishment; it is simply a question of education. As the importance of this is realized, there will undoubtedly be

Dairy Husbandry.

Eliminate Unprofitable Cows.

a much greater demand for instruction in dairying at the College. To meet this demand it is necessary that the department of Dairy Husbandry be provided with better and more extended facilities for its work. The present rooms answer fairly well for the work in certain subjects; but, as explained by Professor Kent, the close proximity of these rooms to the chemical laboratories, and other unfavorable conditions, make it impossible to meet the requirements of the winter course students, and of others who are pursuing advanced work and desire to specialize along the lines of commercial dairying. Besides, these rooms are now too small for some of the larger classes, and as the number of students in dairying increases, it will be still more difficult to do the work in the present quarters. It is important that the dairy division of the proposed new agricultural building be completed as soon as possible, in order that there may be adequate and proper facilities for the most up-to-date work in this department.

Dairy Building Needed.

The Professorship in Poultry Husbandry was established but a year and a half ago. Nearly a year's time was required to complete the equipment for the poultry work, so there has been very little instruction in this subject, except to winter course students. A class was organized at the beginning of the present year for a number of persons who are specially interested in poultry culture, and students have registered for regular work during the second semester. On account of the importance of the poultry industry, there will no doubt be a strong demand for instructional work in this department. The department is provided with the incubator house and other buildings and improvements required in the experimental work, and these are also used to some extent for class purposes. But before satisfactory instructional work can be given, it will be necessary to have rooms for handling and judging fowls, for storage of eggs, for laboratory or practical work in designing and constructing poultry houses and appliances, and for dressing and packing fowls for ship-

Poultry Husbandry.

ment. The office and class rooms should be in the new agricultural building. The other work can be provided for in the frame building used at present by the department of Horticulture. This building can be moved to the poultry grounds and remodeled at small expense so that it will be well adapted to to the needs of the Poultry department.

Demand for Veterinary Science.

In 1907, when the agricultural work was segregated, the subject of veterinary science was taught in the department of Agriculture. Since that time it has been given in the department of Animal Husbandry. The work in animal husbandry covers a broad field in itself; and, while specialists in this department must have a general knowledge of the common ailments of domestic animals and of the remedies therefore, they cannot be expected to be specialists in veterinary science, prepared to train men for work as practitioners. But even if they were, a division of time between animal husbandry and veterinary science would make successful specialization in either of these departments impossible. The live stock interests of the state have assumed such magnitude, and the annual loss from diseases is so great, that it is of the utmost importance that provision be made at the College at the earliest date possible for a complete course in Veterinary Science. In discussing this question Dean Cordley says:

"During the past two years a number of students have applied for registration in a course in Veterinary Science. In view of the great importance of the live stock and dairy industries to the State, and particularly in view of the rapid increase in the number of highly bred animals in the State—animals which it is to the State's interest to protect,—I believe provision should be made at once to organize a course in Veterinary Science at this institution."

In his report for 1907, Secretary Wilson gives the number of live stock in Oregon, exclusive of goats, as 4,441,000, with an aggregate value of $57,739,000. To prevent the spread of contagion and otherwise to reduce loss from diseases among the live stock, a large number of practicing veterinarians are required throughout the different counties of the state. To meet this demand, which is becoming greater every year, students are applying for veterinary work at the College, and there should be no delay in providing for this important line of agricultural education. It would not seem feasible, or necessary, to provide at once for a degree course in Veterinary Medicine; but the equipment should be provided and a professor employed for the work of the department. Students pursuing the regular course in Agriculture could then elect veterinary science as a major during the junior and senior years, and this work with the necessary minor studies would give them the training required to meet present demands. But with the development of the live stock industry of the State, there will no doubt be a corresponding increase in the number of students who will desire veterinary science and it will be necessary to extend the work, and within a few years at most to establish a regular course leading to degrees.

Loss from Tuberculosis.

A recent investigation shows the importance of veterinary work not only as a means of reducing the loss from diseases among live stock, but also of protecting the health of the people. In an address delivered at the Inter-National Congress on Tuberculosis in October, 1908, Dr. A. D. Melvin, Chief of the Bureau of Animal Industry of the U. S. Department of Agriculture, stated that of the 400,000 cattle that had been tested by Federal and State officials with tuberculin prepared by the Bureau of Animal Industry 37,000, or 9.25 per cent, re-acted. On an average, he says, ten per cent of the milch cows of the country are affected with tuberculosis. The estimated loss among cattle and hogs alone from this one disease, including the depreciation in the value of milch cows, decrease in market production, and impairment of breeding qualities, aggregates at least $14,000,000.

From reports received from different parts of Oregon, there is no doubt that tuberculosis exists to a great extent among the live stock, particularly the dairy cattle. Some reports state that from ten to twenty per cent of the cows from which milk is obtained are affected with tuberculosis. According to Dr. Melvin's estimates of the loss by depreciation in the value of milch cows affected with tuberculosis, the loss to this State from the dairy cattle alone aggregates the enormous sum of nearly one hundred thousand dollars annually.

During the year 1905, the Pennsylvania State Department of Agriculture inspected 733 herds of cattle and condemned 1,352 animals with tuberculosis. The Department in speaking of its investigation says:

> "The need for the repression of tuberculosis is two-fold: In the first place, the disease is a very wide-spread affection of cattle and destroys great quantities of property every year. * * * In the second place, tuberculosis is of importance with relation to public health."

Speaking of the special investigations on tuberculosis by the Bureau of Animal Industry, Secretary Wilson, in his report for 1907, explains—

Tuberculous Cows Source of Infection to Man.

> "That the frequency with which tuberculosis occurs as a lung disease justifies the conclusion that the lung is not always infected directly through the air. The work of the year also demonstrates," he continues, "that the commonest mode for the discharge of tubercle bacilli from the bodies of tuberculous cows is with their feces, that about 40 per cent of the tuberculous cows that show no outward symptoms are expelling and scattering tubercle bacilli and that tuberacle bacilli passed with the feces of tuberculous cows are actively pathogenic. When it is borne in mind how frequently milk contains cow feces, and that the percentage of dairy cows known to be tuberculous is considerable, the facts presented seem to warrant the conclusion that tuberculous cows are responsible in a great measure for the *prevalence* of *tuberculosis* in the *human family*."

An investigation was made in the District of Columbia during 1907, and the tuberculosis test was applied to thirty-seven herds with 658 cattle, of which 118, or 18 per cent, were found to be tuberculous. Secretary Wilson also states that an—

"Examination of the sediment taken from the cream separators of public creameries throughout the country has demonstrated the presence of tubercle bacilli in about one-fourth of the samples."

In Bulletin No. 93, U. S. Department of Agriculture, issued in 1906, Dr. Schroeder and Dr. Cotton give an account of extended experiments in relation to tuberculosis and the mode of infection, and conclude with this statement:

"It seems from this array of facts, every one of which is based on positive experimental evidence, that we should feel no doubt regarding our plain duty, which is, no matter what other measures we adopt in our fight against tuberculosis, not to neglect one of the chief, if not the most important, source of infection—the tuberculous dairy cow."

And again, in special circular No. 127, on Tubercle Bacilli in Butter, issued in 1908 by the same specialists, paragraph seven of the summary is as follows:

"Unimpeachable evidence proves conclusively that tubercle bacilli of the bovine type, from bovine sources, must be classed as highly infectious for man; hence, tubercle bacilli in butter cannot be ignored because they are usually derived from bovine sources."

Independent Investigations.

A series of independent investigations have been made contemporaneously by Dr. Mohler and Dr. Washburn of the Pathological Division of the Bureau of Animal Industry, and in bulletin No. 96, issued in 1907, containing an account of these investigations, it is explained that it has been shown decisively that tubercle bacilli of the bovine type will produce the disease in man. One of the conclusions is stated thus:

"There is a certain proportion of cases of human tuberculosis in which may be found tubercle bacilli which are pathogenic for cattle."

An investigation of this question has been made in different countries, particularly in Germany and England. It is reported that of the number of—

"German cases investigated, one-seventh, and of the English cases about one-third, were caused by bacilli of the bovine type * * * It is clearly established that the important point is that the same kind of tubercle baccillus that produces disease in cattle may also produce disease in men. Upon this point there seems to be no room for difference of opinion."

Germany, England.

Referring to the discussion at the recent Tuberculosis Congress, the American Medicine (Philadelphia) says that—

"The great majority of scientific students of tuberculosis firmly believe that bovine and human types of the disease are interchangeable, and there are good reasons for this opinion."

There can be no possible doubt in regard to the extent to which the live stock of the country are affected with tuberculosis and the immense losses resulting therefrom. However, there are many people—among them eminent scientists—who disagree with the conclusions indicated above in regard to the inter-changeability of the bovine and human types of the disease. But whatever differences of opinion there may be in regard to this particular question, the results of the extensive and disinterested investigations that have been made both in this country and in Europe leave no doubt as to the importance of using every possible precaution against the transmission of the disease to man.

Other Diseases.

Although undoubtedly the worst, yet tuberculosis is only one of the many diseases from which the live stock industry is suffering heavy annual losses. Such other diseases as black-leg, glanders, mange, cerebo spinal meningitis, influenza, distemper, fluke, are more or less prevalent throughout the State. The control and eradication of contagious diseases are of the very greatest importance and can be effected only by the enforcement of a rigid system of inspection and quarantine. The use of preventives, such as vaccine for black-leg in cattle; and of diagnostic materials, such as tuberculin for tuberculosis in cattle and mallein for glanders in horses, is now saving millions of dollars annually to the country. And this amount would be increased many fold if there were a sufficient number of trained veterinarians in the field to do the work. In Oregon it is the duty of the Agricultural College to train the men required.

To arrange for the veterinary work at the College, in the way referred to above, there will be required an office, a class room, a laboratory, and hospital stalls, with the necessary equipment of instruments. The stalls could be provided for in one of the old barns at comparatively small cost. The entire cost of this work, including the salary of the professor, will amount to from $3,000 to $4,000 a year.

Irrigation, Drainage.

Irrigation and drainage is another important line of agricultural work that should receive consideration. Large tracts of land are now being reclaimed by irrigation, and many thousands of acres of other lands can be reclaimed or very much improved by drainage. In addition to the lands in Eastern and Southern Oregon now under irrigation, and other tracts that will be reclaimed under the Government projects and by private enterprises, there can no longer be any doubt as to the value of irrigation in many parts of the Willamette Valley. In some sections of the State where irrigation is being practiced, the low lands are becoming water-logged through seepage and alkali is rising to the surface, rendering practically valueless large tracts that had formerly been very productive. The only way to reclaim such lands is by drainage. For this important work special training is required. While the department of Agronomy has done very valuable work in irrigation and drainage, the conditions are now such that a special department should be established for this work.

In several of the land-grant institutions a department of rural engineering is maintained which comprises the work along the different lines of irrigation and drainage and agricultural mechanics, including such subjects as field machinery, farm power machinery, fences, farm roads; but, on account of the extensive area of Oregon and the magnitude of the work in irrigation and drainage, all the time of one man at least would be required in this particular work, and better results would certainly be achieved than if the time of the professor should be divided between the two departments. By establishing a department of Irrigation and Drainage the professor in charge could not only take care of the work at the College, but could render very valuable assistance in experimental and extension work in different parts of the state. Very little expense would be involved, except for the salary of the professor.

Industrial Economics.

As soon as conditions will warrant, though it may not be feasible at this time on account of the expense, a professorship should also be established in industrial or rural economics. The work of this department would include different subjects connected with economic problems of agriculture, such as agricultural methods, farm finances, cost and relative profits of different farm operations, exports, ownership, taxes, land laws, organizations, and the relation of agriculture to other industries. A specialist in charge of this department could give work especially adapted to the requirements of students in the different courses; and, by research and investigation, could render service that would be of great value in the general work of economic improvement throughout the state.

EXPERIMENT STATION.

Experimental Work Strengthened.

All members of the faculty who are heads of departments of agriculture are also members of the Experiment Station Staff, and have charge of the corresponding work of research and experimentation. Therefore what has been said in a former section of this report of the establishment of professorships in agriculture and of the resulting extension and strengthening of the instructional work, is also true of the experimental work. Dr. Withycombe in his report explains the extent and character of the work of the different departments of the Station, and indicates the results that have already been obtained in the solution of the problems that are encountered in the development of the agricultural interests of the state.

Subjects Under Investigation.

Each department of the Station is making certain independent special investigations, while a number of the departments do co-operative work covering a broader field. There is also co-operative work along certain lines with the U. S. Department of Agriculture, and to some extent with the fruit growers and farmers in different parts of the state. The most important subjects under investigation are as follows: In Agronomy, soil fertility, value of alfalfa for hay and pasture, value of kale as a winter succulent feed, variety testing of vetch, improvement of fertility by clover cropping, breeding wheats for increase in quantity and quality of yield, value of irrigation for different crops in the Willamette Valley: in Animal Husbandry, soiling dairy cows, digestibility of steamed corn and vetch silage, determination of value of kale as a winter feed for swine: in Dairy Husbandry, fat contents of hand separator cream, milking machines, fat production of individual cows, intensive dairying with the Station herd, percentage of solids other than fat in milk: in Poultry Husbandry, brooding, incubation problems, including natural and artificial incubation: in Horticulture, cross pollination of the apple, cover crops, cultural methods, irrigation of fruit in Rogue River Valley, determination of the best varieties for Willamette Valley: in Entomology, gumosis of the cherry, peach tree spot, lime-sulphur spray, including control of apple scab and other fungus diseases, apple tree anthracnose, demonstrating the extent to which it is possible to exterminate the disease: in Agricultural Chemistry, soil leaching, digestibility of corn and vetch silage, chemical studies in incubation, composition of milk, potash determinations: in Bacteriology, cause of mortality in incubator chicks, transmission by feeding to fowls of tubercle bacilli of the bovine and human types.

Co-operative Work.

In certain phases of this work the departments of Chemistry and Bacteriology are co-operating with the Poultry Husbandry department; the department of Chemistry, with Animal Husbandry and Agronomy; and the department of Entomology, with Horticulture; while the department of Agronomy is co-operating with the U. S. Department of Agriculture in irrigation and in testing different varieties of vetch.

During the year 1907-1908, seven bulletins were issued, aggregating 63,000 copies, with a total of 12,079,000 pages circulated. Upwards of 10,000 letters were written by members of the Station Staff in reply to correspondents desiring information or advice.

Free Routine Work.

The demand upon the Station for free routine work has increased to such an extent that it will be necessary to make some special provision for this work, if it be continued, since the Federal appropriations to the Experiment Station can be used only for strictly scientific work of investigation. This work comes mostly to the departments of Chemistry, Entomology, and Bacteriology, and includes tests for different diseases, such as tuberculosis; and the examination, or analysis, of soils, waters, oils, clays, insecticides, feeding stuffs, phosphates, lime, gypsum, etc. Much of it is important work, frequently involving questions relating to the public health, or to the establishment of important industries. Provision should be made for it if possible.

Special attention is called to the report of the Director regarding the importance of procuring additional land for the work in agronomy, dairying, animal husbandry, and horticulture. The College owns 224 acres of land. Upwards of 40 acres of this is required for the campus, leaving about 180 acres for the farm, gardens, and orchards,—an amount entirely inadequate for the proper development of the agricultural work of the institution. The amount of land required by the agricultural and mechanical colleges is shown by the fact that the Iowa State College of Agriculture and Mechanic Arts has 1,175 acres; the Kansas Agricultural College, 430; the Massachusetts Agricultural College, 404; the Michigan Agricultural College, 684; the North Dakota Agricultural College, 640; the University of Illinois, 665; the University of Ohio, 439; the South Dakota Agricultural College, 560; the University of Wisconsin, 500; the Washington State College, 410; the Colorado Agricultural College, 1,818; and the University of California, 779. Notwithstanding the fact that the University of Wisconsin then owned more than 400 acres, that institution three years ago expended $77,000 for additional land for its college of agriculture. Iowa also, with more than 800 acres, has bought, during the last four years, 300 acres for the use of the departments of animal husbandry, agronomy, forestry, and horticulture. All these departments in the Oregon Agricultural College are in urgent need of more land.

Additional Land Needed.

When the departments of dairy and animal husbandry are provided with the different breeds of live stock required for the work of instruction and experiment, large tracts of land will be required to produce sufficient feed and pasture for these animals, besides what is needed for the work of the other departments named. Aside from the necessity of having adequate room for all of the work of investigation, the importance of having plenty of land for class work may be realized when it is considered that the farm, orchards, and gardens constitute an important part of the field laboratory equipment for the agricultural students.

Union Branch Station.

The principal lines of investigation at the branch station at Union have related to the production of high-grade sugar beets, the improvement of forage crops and cereals by breeding and selection, the determination of grasses best adapted to local range conditions, the investigation of different forage plants, particularly alfalfa, adapted to dry-land farming, and the collection of important data relating to fruit growing by an orchard survey of the Grande Ronde Valley. Important work has already been accomplished by this station. It can no doubt be strengthened, however, and made of even greater value not only to Grande Ronde Valley, but also to other parts of Eastern Oregon. The specialists in the College should be kept in closer touch with the work. They should plan the experiments in consultation with the superintendent, and should have general direction of the work of their particular departments. This will avoid unnecessary duplication of effort, will give the superintendent the advantage of constant expert assistance, and will insure greater unity of effort and a higher degree of general efficiency. By using the station at Union as a center of operations, important work can be done at comparatively little cost in different other districts, not too remote, through cooperation with progressive farmers. This will make possible the solution of problems of peculiar local interest which could not be reached by the work at the station itself.

Land Reclaimed by Irrigation.

The reclamation by irrigation of large tracts of land where the precipitation of moisture is insufficient to produce profitable crops is becomng one of the most important features in the agricultural development of the United States. By irrigation, millions of acres of otherwise desert lands have been reclaimed during recent years and converted into the most certain and productive farms of the country. As given in the Report of the U. S. Department of Agriculture for 1907, more than 11,000,000 acres were under irrigation during that year; and produced crops valued at $175,000,000. For 1908, it is estimated that the area was increased by 5,000,000 acres, making the total amount of land in the United States under irrigation 16,000,000 acres, with a productive capacity of more than $250,000,000. So important has this reclamation work come to be regarded, that the Reclamation Service of the Federal Government has expended $38,780,000, to which it is adding several millions each year, for the devolpment of irrigation enterprises of such magnitude that they cannot be handled by private capital. Of this amount, the expenditures in the Pacific district aggregate $9,512,000. The amount expended to December 1, 1908, on the Klamath Project was $1,644,000; while the Umatilla Project will have cost when completed $1,200,000.

Difficulties Encountered.

It has been discovered, however, and is being woefully realized every year, that to convey the water from the streams to the land does not solve the entire problem of reclaiming the desert. As soon as the water is applied to the land, difficulties almost innumerable arise about which most of the people, who have had no experience in irrigation, have no knowledge, and with which they are unable to cope. The quantity of water, the time and method of application, and the methods and degrees of tillage, that will produce the best crops of different kinds, under varying conditions of soil and climate,—these are a few of the many questions that must be determined before satisfactory results can be obtained on these lands. To determine the best varieties of fruits and other crops adapted to local conditions, and the most economic means of conserving the fertility of the soil under irrigation; and to solve the other innumerable questions that confront the people in the irrigation districts, under conditions entirely strange to most of them at least,—are tasks impossible of accomplishment by the individual land owners. These difficulties can be overcome only by the maintenance of demonstration farms, or experiment stations, in charge of expert scientists, and provided with the necessary equipment for thorough investigational work.

Irrigation Experiment Station Needed.

At the solicitation of prominent citizens interested in the Umatilla Irrigation Project, the Oregon Agricultural College undertook an investigation, during the month of September, 1908, with the view of determining whether or not it would be necessary to establish an irrigation demonstration farm, or experiment station, on or near that project; and, if so, the feasibility of obtaining the necessary funds for the maintenance of such station. The party making this investigation included, besides the President of the College and his Secretary, Professor Scudder of the department of Agronomy; Mr. A. P. Stover, Irrigation Specialist of the Division of Irrigation, U. S. Office of Eperiment Stations; and Mr. W. M. Jardine, Cereal Expert in the Bureau of Plant Industry, U. S. Department of Agriculture. A careful examination of the lands in the project, and a consideration of the climatic and other conditions, in connection with the large local and state interests involved, left no doubt either as to the necessity or feasibility of the work. It was apparent also that the work would require the most careful consideration, and that it should be taken up at once, and pushed with all possible vigor, in order to avoid the failure of a large proportion of those who are settling on the project. The Reclamation Service had already set aside forty acres of the best land on the project for a demonstration farm, and experiment station. On account of the great expense involved in preparing land, constructing laterals, and providing the necessary buildings and other permanent improvements, besides the heavy annual outlay that would be required for maintenance, the College authorities began negotiations for the co-operative assistance of the Department of the Interior and of the Department of Agriculture. Under instructions from the Board of Regents, the President visited Washington in November for the purpose of interviewing the different Government officials in regard to this important work. The uniformly courteous and prompt consideration received from these officials was most gratifying, indeed. Every proposition presented was approved, and the State can depend upon whatever assistance it is possible for the Federal Government to give, not

Investigation of Conditions on Umatilla Project.

College Solicits Government Aid.

only in this but in other experimental work. The attitude of the Reclamation Service is indicated by the following letter from the Honorable James R. Garfield, Secretary of the Interior, dated November 21, 1908:

Reclamation Service Furnishes Land and Improvements.

"Following your suggestion for co-operative work on an experiment and demonstration farm on the Umatilla project, Oregon, I have carefully looked into the matter and am very glad to state that it will be entirely feasible to co-operate with the State in this very necessary work. The interest of yourself, your College, and other public-spirited citizens of Oregon, is highly appreciated, and I feel confident that good results will follow united efforts in this direction.

"Accordingly, I have authorized the use of $3500 of the Reclamation Fund for providing permanent improvements and equipment for a demonstration farm, and have directed that the preparation of the farm be undertaken and carried to completion as soon as possible.

"This action is taken with the understanding that an earnest effort will be made to secure authority and funds from the State Legislature to maintain and operate this demonstration farm in the interests of the settlers. You are authorized to use this letter as an indication of the attitude of this Department upon this subject."

On the same date a letter was received from Acting Director A. B. Davis of the Reclamation Service, in which occurs the following statement:

"This is a very useful and necessary work, and the Reclamation Service will be glad to co-operate with your College in every way possible. I have already issued orders to the Project Engineer to prepare for the equipment of this farm, after a conference with you or your representative."

In accordance with the foregoing, the Department of the Interior provides the land, properly cleared and fenced, with water for irrigation conveyed by ditches or pipes over all parts of the farm, and the necessary permanent improvements and initial equipment. The buildings to be provided, as planned in conference with the Project Engineer, Mr. H. D. Newell, include a cottage for the superintendent, a deep water well, a barn and storage building, and a small building to be used for an office and a laboratory.

Department of Agriculture Co-operates with State in Maintenance.

Negotiations were also entered upon with the Department of Agriculture for the purpose of securing the co-operative assistance of this Department in the maintenance of the station. In a letter received from Dr. B. T. Galloway, Chief of the Bureau of Plant Industry, dated November 25, 1908, it is stated that "this Bureau is desirous of assisting in this work in every way possible." After referring to the proposition of the Reclamation Service to provide the land, buildings, and other improvements necessary, on condition that funds be secured for the maintenance of the station, Dr. Galloway explains that in the appropriations requested from Congress for the next fiscal year, provision is made for certain co-operative experimental work; and continues:

> "I believe it is estimated that it will require between $5,000 and $6,000 per annum to operate this experiment station along the lines contemplated, and in case the above mentioned appropriation is made by Congress, we will contribute approximately one-half of this sum. Of course, it would be impossible, in advance of Congressional action, for me to say definitely that we can aid you financially, but I can assure you that in case Congress acts favorably in the matter, we will be glad to aid you, both financially and otherwise. In any event, we shall do whatever we can in the way of giving you expert aid.
>
> "It is my opinion, that, as a matter of policy, the experimental and investigational work on these Reclamation Projects should be supported, chiefly by the States in which the Projects lie, and we stand ready to assist in the experimental and investigational work on these farms to the fullest extent of our power."

While the proposition of the Department of Agriculture is conditional on receiving from Congress the appropriations referred to, since the matter has the hearty endorsement of the Secretary of Agriculture and the Secretary of the Interior, as well as the different experts directly interested, there is really no doubt in regard to the co-operation of this Department in the way indicated. These propositions from the National Government, however, are both contingent upon the establishment of the experiment station by the State Legislature, and upon an appropriation from the State for approximately one-half the expense of maintenance. The difficulties on the Umatilla Project are such that the larger amount mentioned by Dr. Galloway will no doubt be required. It will be necessary, therefore, for the State to appropriate $3,000 as its proportion of the maintenance expense.

State Appropriation Required.

Another very important line of investigation that should receive attention by the State is dry-land farming. There are large tracts of land that cannot be irrigated and on which ordinary crops cannot be profitably produced. By discovering or producing, by selection and breeding, the different varieties that have the necessary drouth-resistant qualities, hundreds of thousands of acres of land in Eastern Oregon that are now practically valueless can be brought under successful cultivation. As an illustration of what can be accomplished in this connection, reference may be made to the work of the U. S. Department of Agriculture in introducing durum wheat into this country. From 1899 to 1902 different varieties of this wheat were brought from Russia and Africa which formed, as stated by Secretary Wilson, "practically the entire foundation of the present crop of durum wheat. At a cost of $10,000 in the beginning, a crop worth $30,000,000 is now growing in regions of low rainfall where in the days of stock ranges a steer roamed on twenty acres to find his living." In 1905, 10,000,000 bushels of this wheat were exported to Europe; and, in 1906, 20,000,000 bushels.

Dry-land Farming.

Durum Wheat.

In 1907, 3,000,000 acres were sown to the durum wheat, and produced an average crop of fifteen bushels to the acre.

Advantages of Diversified Farming.

In certain sections of Oregon there are large areas of land that are now under cultivation and that are producing profitable crops on alternate years, by the process of fallowing. Such land can be farmed successfully only in large tracts, and the system of farming is unavoidably such as to render impracticable the establishment of many homes on the land. The question, therefore, of working out a system of rotation that will make possible a crop every year instead of one in two or three years, while at the same time conserving the fertility of the soil and providing forage for dairy animals, becomes a very important one. This would increase the productiveness and therefore the value of the land, especially when farmed in small tracts; and many of the large farms would then be divided and sold to small holders for homes,—all of which would increase the permanency of residence, would add to the educational and social advantages of the rural country, and would increase the revenues of the State. But these questions cannot be solved by the individual farmers on account of the large expense involved and the lack of the necessary scientific training. By the establishment of branch experiment stations, however, this work can be done at comparatively small cost. On the tour of investigation referred to above this matter also received very careful consideration, and it was determined that such work is not only feasible but is of the greatest importance in the development of a system of permanent agriculture in many parts of central and eastern Oregon.

Branch Dry-land Station Required.

As a means of reducing the cost to the State, the cooperation of the U. S. Department of Agriculture was also solicited in the maintenance of a dry-farm experiment station. Regarding this work, Dr. Galloway, in a communication dated December 10, 1908, says:

"In reference to our conversation of the 21st ultimo, relative to the establishment of a dry-farm experimental station for co-operative work between the Bureau of Plant Industry and the Oregon Agricultural College Experiment Station, I submit the following statements for your consideration:

U. S. Department of Agriculture Will Assist.

"The Bureau of Plant Industry of the U. S. Department of Agriculture is willing and anxious to assist in the improvement of its agriculture, to whatever extent the funds of the Department will allow, when convinced that the people of such State are doing everything reasonably within their power to improve their own agricultural conditions.

"The Bureau of Plant Industry is willing to assist the people of Oregon in the maintenance of a dry-farm experimental station where problems vital to the agriculture of that region can be worked out. The Bureau, therefore, will bear the expense of employing a scientist to personally supervise the work of experimentation and any additional expense connected with the administration and inspection of the station, such total expense for the present to be between $2,500 and $3,000 annually."

Legislative Action Necessary.

This proposition is made with the understanding that the land, improvements, and initial equipment will be provided, and that the State will appropriate an amount annually for maintenance equal to that expended by the Department. Should the establishment of such station be approved, it will be necessary for the Legislature to appropriate $2,500 a year for maintenance. The matter of locating the station, however, should be left to the Board of Regents, after a thorough investigation has been made by experts from the College and a representative of the U. S. Department of Agriculture. This is very important in order that the necessary information may be had to secure the establishment of the station at such point that the conditions will be typical of the largest possible area, and the work at the station, therefore, of the greatest possible value.

COLLEGE EXTENSION.

One of the most pressing needs in the development of agriculture is for the different phases of extension work which carry to the farmers up-to-date information on agricultural subjects. It is being recognized more and more that the matter of superceding by modern scientific work the methods that have characterized agriculture in the past, is a question of educating the people on the farms. At best, comparatively few of the farmers of the state can pursue work in residence at the College. New truths are being discovered, and new applications are continually being made of principles already known. But these are of practical value only to the extent that they are understood and utilized by the farmers. So important has the matter of college extension in agriculture come to be regarded, that there is probably more attention being given to it at the present time than to any other phase of agricultural education. On account of the remarkable development of agricultural science along all lines during recent years, the matter of improving the farms of the country is not now so much a question of discovering new truths, as it is of securing the practical application of facts already understood. As stated in a letter received from the Honorable John Hamilton, Farmers' Institute Specialist of the Office of Experiment Stations, dated December 21, 1908:

Importance of Extension Work.

"We have now an almost unlimited amount of agricultural information accumulated in various depositories. We have not yet been able apparently to devise an effective plan for the distribution of this information. It is true, we have been printing bulletins by the million, but unfortunately many of these are not read and many that are read are not well enough understood or appreciated to be properly utilized. We are needing a system of dissemination that will not only take the information to the individual in a way that he can understand, but that will see that it is incorporated into his every-day practice. My belief is that the movable school will

Mr. Hamilton's views.

be an important aid in doing this, and the demonstration field with the advisory professor, who will look after the agriculture of a given district and conduct the demonstration plots or fields in various communities, will be the agent to see that the knowledge imparted is incorporated into farm operations."

At different times during the last few years the subject of extension teaching has received most careful consideration by different state, and national, or inter-national, organizations, notably the American Association of Farmers' Institute Workers, and the Association of American Agricultural Colleges and Experiment Stations. At the convention of the latter organization in Washington, D. C., November 19, 1908, a report of the committee on extension work was adopted, in which it is recommended—

"That each college represented in this Association organize, as soon as possible, a department of extension teaching in agriculture, co-ordinate with other departments or divisions of the agricultural work, with a competent director in charge, and if possible with a corps of men at his disposal." In the same report it is urged that in the extension department "there should be fully organized the economic and social phases of agriculture, and also that great, untouched field of educational work—home life on the farm."

Different phases of agricultural extension work include study clubs, farmers' institutes, itinerant schools, publications, personal correspondence, and correspondence courses.

Extension Enterprises.

Several states have made great progress in recent years in the development of this work. This is notably true of Iowa. In April, 1905, the legislature of that state appropriated $15,000 to the College of Agriculture and Mechanic Arts for the organization and maintenance of a system of agricultural extension work, and at the subsequent session this amount was increased to $27,000. With this appropriation the College is empowered—

"To give instruction on corn and stock judging at agricultural fairs, institutes, and clubs, and to aid in conducting short courses of instruction at suitable places throughout the State; to give lectures and demonstrations on the growing of crops and fruits, on stock raising, dairying, land drainage, and kindred subjects, including domestic science. The work is to be planned so as to carry to the communities remote from college the benefits of skillful instruction given by the teachers in the State College, and the results reached in the work of the experiment station."

Work in Iowa.

Up to the present time, farmers' institutes have constituted the most important agency for extension work in agriculture. Until within the last few years the institute work consisted largely of lectures of a more or less popular character, and, as a matter of giving the farmers general information and of encouraging them to improve their methods, the work no doubt has been of great value. But the most important work now required is practical demonstration work which enables the farmers to get a workable knowledge of the subjects presented. For this work several states are organizing movable schools. These schools are in charge of an expert instructor, with assistants, who are provided with the necessary equipment, and travel from place to place, holding schools of two or more days duration at each place. The work is of the most practical character, the purpose being to give such a comprehensive understanding of each subject that what is learned can be applied on the farm. During the past year, the schools generally continued through only two days. In most states that have established these schools, however, the work has been so successful that the time is extended this year to a week, and in some states to two weeks. The plan varies in different states according to local conditions and the amount of money available for the expense.

Movable Schools.

As soon as practicable the Oregon Agricultural College should organize a regular department of agricultural extension. Sufficient money should be provided to meet the expense of at least one traveling school that should be kept in the field for from eight to ten months of the year. The work could then be more fully organized and extended as conditions may warrant.

During the year 1906-1907, there were held in the United States, 3,927 farmers' institutes, 11,514 sessions, in forty-five states, with a total attendance of 1,596,877. In addition to the regular institutes, eleven states held special institutes for women, while five different states ran demonstration trains. The cost of farmers' institutes for the year was $284,450, while the amounts appropriated for 1908 exceeded $300,000.

Farmers' Institutes.

In Oregon, during 1907 there were held 60 institutes, 157 sessions, in 16 different counties, with an aggregate attendance of 15,700. During this year members of the College faculty spent 219 days in institute work. In 1908 there were 25 regular institutes and 45 demonstration train institutes, with 98 sessions, in 23 different counties. The aggregate attendance at the regular institutes was 7,070, and at the demonstration train institutes, 25,250, making a total attendance at all of the institutes of 32,320. The work covered practically all of the different lines of agriculture of interest in Oregon, besides special work in some of the institutes for women.

Assistance of Railroads.

Special credit is due to the Southern Pacific and the Oregon Railway and Navigation companies for the assistance they have given in this important work. In addition to providing the institute lecturers with transportation over their lines for the regular institutes, these companies furnished free of cost two demonstration trains fully equipped with exhibit and demonstration cars, lecture coach, and sleeper. This work is of exceptional value in arousing among the people greater interest in the importance of improved methods in agriculture. The demonstration train through the Willamette Valley during the month of November, 1908, was especially successful. So far as known this is the most elaborate train of the kind that has ever been sent out in the United States. Seven cars were fully equipped for the work. Besides the College professors in charge of the different departments, a number of prominent railroad officials and representatives of the press accompanied the train. Congratulatory letters have been received from Government officials and others on both the extent and character of the work done and the complete account given of it by the press—particularly the Pacific Northwest.

Cost of Extension Enterprises.

For the most effective work in farmers' institutes, and other itinerant phases of agricultural extension, there should be an appropriation from the Legislature sufficient to provide for the employment of a superintendent who could devote his entire time to the work, in addition to the other expenses of speakers and publications. The importance of the work is such that from $5,000 to $10,000 a year could be used to very good advantage. Indeed, a much larger sum even than this would be required to fully organize the work and extend it throughout all parts of the state. In planning all such enterprises, it is well to bear in mind that the most expensive work, and in many respects the most important, is required in the remote and least accessible sections of the state, where the difficulties with which the people have to contend are frequently the greatest.

ENGINEERING AND MECHANIC ARTS.

The School of Engineering and Mechanic Arts offers courses leading to degrees in Civil Engineering, Electrical Engineering, Mechanical Engineering, and Mining Engineering; also an elementary course in Mechanic Arts for training in the handicrafts. This School is fully organized with a Dean of the School and a Professor in charge of each department. As given in Dean Covell's report, the student attendance increased from 199 in 1906-1907 to 444 on November 20, 1908, or 123 per cent. Of the total College registration, about 30 per cent of the students are in Engineering. The distribution of the students among the different courses is as follows: Civil Engineering, 108; Electrical Engineering, 157; Mechanical Engineering, 76; Mining Engineering, 50; and Mechanic Arts, 53. In addition to the work of the regular courses, all students in Agriculture take shop work in carpentry and blacksmithing through at least one year, so that more than half of the entire student body have work in the shops.

Department Statistics.

The importance of engineering in the construction of highways, railroads, factories, and cities, in the improvement of inland waterways, and in the utilization of water power for manufacturing and transportation purposes; and the inter-dependence of engineering and other distinctive lines of College work, have already been referred to in this report and need not be repeated here.

The extent and character of the work being given by each department, and the number of students pursuing the different subjects, are shown in detail in the accompanying report of the Dean, but may be briefly summarized as follows: In Civil Engineering are given 13 different courses in sanitary engineering, roofs and bridges, highway construction, masonry and foundations, irrigation engineering, city and topographic surveying, aggregating 45 semester credit hours in 16 different sections, with a total registration of 200 students; in Electrical Engineering, 11 different courses in dynamo electric machinery, elements of electrical engineering, dynamo design, electrical engineering laboratory, power plants, power plant design, and electrical laboratory, aggregating 30 semester credit hours in 27 sections, with a total registration of 166 students; in Mechanical Engineering, including shop work, are given 28 different courses in hydraulic motors, steam turbines, internal combustion motors, thermodynamics, enginery, steam machinery, engineering laboratory, machine design, hydraulics,

Scope of the Work.

strength of materials, statics and dynamics, materials of engineering, mechanism, descriptive geometry, and mechanical drawing, besides the work in the carpentry, forge, and machine shops, aggregating 81 semester credit hours in 62 sections, with a total registration of 1,041 students; in Mining Engineering are given 12 different courses in metallurgy of copper, general metallurgy, mining law, mining, fire assaying, mine surveying, metallurgy of iron and steel, excavating and tunneling, geology, and mineralogy, aggregating 40 semester credit hours in 18 sections, with a total registration of 177 students.

Additional Equipment, Instructors Required.

During the biennium the facilities for the work in engineering have been extended and very much improved by the purchase of important equipment, and by the completion of the Mechanic Arts building and the improvements that have been made in Mechanical Hall. A number of additional instructors have also been employed. But, with the means available, it has been impossible to provide the additional equipment and instructing force required to meet the increased demands. The large number of students in the engineering work, and the increase in the number of advanced subjects given, make it imperative that additional instructors be employed during the next biennium. As explained by Dean Covell, extended equipment is required for the work in the engineering laboratories. The most important items of this equipment needed at this time are given in detail in the appended report of the Departmental Estimates of Requirements.

Foundry Needed.

In connection with the shop equipment, the most urgent need is for a foundry and a wheelwright shop. Students in engineering should be given courses in moulding and casting as a part of their regular shop work; besides, with a foundry provided, the students could make the castings required for machines and other apparatus that could then be made in the machine shop, thereby saving in a short time, in the value of such equipment, the entire cost of the foundry. There is a demand also for this work by students who are pursuing the elementary industrial course, and who desire to become expert moulders or wheelwrights. The cheapest and best plan by which to provide for this work would probably be to construct a small building extending south from the present forge shop, parallel with Mechanical Hall. This would make it possible to connect with the present blast and exhaust fans. It would also be a convenient location on account of its close proximity to the other shops. This building could be constructed on the same general plan as the east wing of the Mechanic Arts building, and would be comparatively inexpensive.

Importance of Highway Engineering.

An important line of engineering work for which there is great demand throughout the state is road building. According to the Office of Public Roads, U. S. Department of Agriculture, there were in Oregon in 1904, 34,258 miles of public highways, exclusive of the streets in cities and towns. During that year upwards of $796,000 were expended on roads. This is an equivalent of more than $23 per mile, or nearly $2 per capita of state population. If the cities, the streets of which are not included in the above, be omitted the cost is $3 per capita. That the people of the state appreciate the importance of good roads is clearly shown by the fact that they spend so much for their improvement. But, while nearly $800,000 is contributed every year for building or improving public highways, what provision is made for training men to use this money in the most economic and effective way? It is impossible to determine, even approximately, the extent of the waste resulting from incompetent supervision of road building, but practical men who have had years of experience in this work have estimated that it is at least 25 per cent, and in many cases will reach as much as one-half. Even assuming that the loss is not in excess of 15 per cent, a very conservative estimate, this would amount to nearly $120,000 annually—several times greater than the entire amount required to meet the expense of all the engineering work in the Oregon Agricultural College. The only way to get good roads is to have trained men supervise their construction.

To meet this demand, the College should establish and equip at once a department of Highway Engineering; or, if this be not feasible, provision should at least be made in the department of Civil Engineering for the employment of a specialist to give his entire time to this work. As stated by Professor Skelton in his report to the President:

Work to be Accomplished.

> "Through the agricultural Experiment Station, the College is doing a great work for the farmer and the horticulturist, but it has no funds with which it may help the cause of good roads further than it is now doing. We need funds to establish a properly equipped laboratory for the investigation of road problems. Enough help should be provided for the extension of work by which people may be given assistance in building roads, just as the Experiment Station staff are helping the farmers through institute and similar means. It should maintain a testing laboratory for the purpose of obtaining exact and reliable data on road building of all kinds, including cement which is coming extensively into use for culverts, bridges, etc. The best means of building roads and the cost should be investigated by the College and the results given to the people. Institutes for the instruction of road officials should be held, and every aid possible should be extended to the great movement for the betterment of our highways."

Applications for Architecture.

A number of students are applying every term for work in architecture. With the different departments of engineering properly equipped for the structural work, provision could be made at comparatively little cost to meet the present needs of these students, by the employment of a good instructor in architectural design and drawing.

DOMESTIC SCIENCE AND ART.

In a former division of this report reference is made to the importance of special training for women in the science and art of home making. The Oregon Agricultural College was one of the first institutions in the country to inaugurate instruction in household science. As early as 1890 courses were offered in cooking and sewing, and a specialist was employed for this work. The value of what has been accomplished along these lines during the past eighteen years is realized in hundreds of homes throughout the state.

School Organized.

During the past year the work of the department has been largely extended, and has been organized into the School of Domestic Science and Art, with a faculty of five specialists in charge of the different subjects. Two courses are offered: an elementary two-year course, and a course leading to degrees. The elementary course is especially adapted to women who can spend but a short time in school and who desire to emphasize the work pertaining to the every-day duties of home life. This course is essentially practical, including as distinctive features such work as laundering, cooking, fruit work, sanitation and hygiene, hand and machine sewing, and dressmaking. While students are made familar with the underlying principles, a large part of their time in the department is given to practical or laboratory work. In addition to the special work, as much time as possible is devoted to the general subjects, such as English, mathematics, history, drawing.

Extent of Work Given.

The degree course extends through four years and includes, in addition to the work in the basic subjects of chemistry, physiology, physics, and bacteriology, thorough training in the different subjects of greatest value to the skilled housekeeper—cookery, foods, dietetics, marketing, laundering, house sanitation, household economics, home nursing, house construction and furnishing, sewing, drafting, costume design, dressmaking, tailoring, millinery. This course is also well adapted to persons who desire to teach domestic science and art. Students may specialize along different lines in which they have interest in preparation for professional work.

Student Attendance.

The number of students enrolled on November 1, 1908, was 177, an increase of 40 per cent over the preceding year. Of these, 19 were in the elementary course, and 158 were either in the college course or were pursuing advanced work as graduate students. The subjects given during the first term of the present year include: principles of cookery, advanced cookery, nature study, bacteriology, house sanitation, plain sewing, dressmaking, tailoring, millinery, house construction, basketry and weaving, and costume design, with a total registration in all subjects of 554 students in 27 different sections.

Extended Facilities Improved.

The facilities for this work were also increased and very much improved. The science work is provided for on the first floor of Waldo Hall. In addition to the office of the Dean, and the class rooms, there are two cooking laboratories and a science laboratory with the most modern equipment, including desks, gas, and ranges; storage rooms, a laundry, and the necessary general equipment for the most up-to-date work. For the work in domestic arts, temporary provision is made on the second floor of the new Agronomy building. The equipment for this work includes an office, class rooms, and three large rooms fully equipped for the work in drafting, dressmaking, millinery, sewing, house construction, etc.

During the next two years it will be necessary to provide complete equipment for the laundry, for both school and dormitory purposes, and for an additional cooking laboratory. An additional instructor will also be required, at least during the second year.

COMMERCE

Character of Work.

In the School of Commerce thorough courses are given in the different subjects of business administration, including accounting and auditing; political economy, including banking and finance; political science, including commercial law; and stenography and typewriting. Special emphasis is placed upon the training in business methods required by students in the other different courses—engineering, agriculture, forestry, pharmacy, and domestic science and art. It is coming to be recognized more than ever before that to succeed in any business or profession one must have training in the application of business principles. In recognition of this, the College provides in the School of Commerce courses in business methods specially adapted to the particular needs of persons engaged in the different industrial vocations or professions.

As reported by Dean Bexell, on November 1, 1908, there were 212 students registered in the commercial courses. The subjects given include elementary and advanced accounting and auditing, business practice, banking and business management, banking and finance, commercial law, civil government, stenography and typewriting, pharmacy accounting, household business management, and business organizations.

Commercial Work Inexpensive.

The work in commerce is comparatively inexpensive, though it is of great importance to all the students of the institution, regardless of the courses they may be pursuing. Since most of the students in all of the courses have certain work in commerce, it will be necessary to provide an additional instructor for this work.

FORESTRY.

There is an increasing interest in the course in Forestry. The number of students enrolled is much larger than during the preceding year, and the attendance would be still greater if the department were properly equipped for the work. Inquiries are received from different parts of the Northwest regarding the advantages afforded by the College for training in forestry, but it has not been possible to offer any special inducement for persons to take up this work, although the students who have entered the course have been given the best training possible under the circumstances.

Interest in Forestry.

For years emphasis has been placed upon certain lines of agriculture that represent an annual income to the state of less than one-fourth of the income from the forest industry, and yet comparatively little attention has been given to the importance of forestry education. With standing timber estimated by the U. S. Forest Service at upwards of three hundred billions of feet, or one-sixth of all the standing timber in the United States, and an annual income of approximately $30,000,000, the forest industry must certainly be regarded as one of the greatest in the state. However, there is an annual loss from preventable causes of from $3,000,000 to $5,000,000. To reduce to a minimum the losses from diseased timber, and from the wasteful methods of harvesting the timber crop, and otherwise to conserve the forest resources and develop the forest industry, a large number of men are required who have had thorough, scientific training in forestry. It is of the utmost importance, therefore, that provision be made as soon as practicable for strengthening the course in forestry by providing the necessary room, equipment, and instructing force required for efficient work.

Necessity for Forest Education.

To provide adequately for this work, Professor Lake estimates that forty acres of land will be required for forest and nursery, besides room for office and class work and for greenhouse laboratory; and the necessary laboratory and other miscellaneous equipment. The most imperative need, however, is for a thoroughly competent instructor for technical work in forestry. All of the equipment referred to above

Equipment Required.

need not be provided at one time. Temporary arrangements can be made without the purchase of the land, though this will be essential later; but, for the work that will be called for during the next two years, it is unavoidable that more room and considerable equipment be provided, and that at least one instructor be employed.

PHARMACY.

Efficiency and Completeness of Work.

In the department of Pharmacy, the number of students in 1906-1907 was 78; in 1907-1908, 80; and in 1908-1909, 91. As reported by Professor McKellips, the College is the only institution in Oregon offering a complete course in pharmacy. More than 95 per cent of its graduates are engaged in professional work at good salaries. The demand for graduates continues to be greater than the supply. The work of the course is arranged so as to meet the requirements of the State Board of Pharmacy, and the efficiency and completeness of the work are shown by the approval received from this Board and by the large percentage of students who are successful in the examinations and who have lucrative positions. The extent and character of the work of the department, and its relation to the other sciences authorized under the Acts of Congress, are shown in the report of Professor McKellips, printed in the Appendices.

MISCELLANEOUS DEPARTMENTS.

The reports of the heads of the different miscellaneous departments all show the large increase there has been in the amount of work given, and urge the necessity for more room for class and laboratory purposes; and, in the science departments, for more equipment. Without exception the importance of increasing the instructing force is emphasized. Since the equipment and instructors needed are given in the Appendices, it is not deemed necessary to encumber this part of the report with a repetition of these items. As an indication of the general conditions in these departments, the following may be mentioned:

Zoology.

In Zoology, the department report shows an increase during the past two years of 800 per cent in the number of courses given, and of 600 per cent in the number of students; and estimates that for the next biennium the increase in the number of courses will be 50 per cent, and in the number of students, 250 per cent. This increase is due in part to the readjustment of the College courses and to the requirement of a larger amount of science work. The work of this department is essentially laboratory work; and, with the number of students in attendance during the next two years, a large number of microscopes and other important equipment will be required. Several additional rooms will also be needed, and at least one additional instructor.

Chemistry.

The department of Chemistry is perhaps the most crowded of all the departments in the institution for room, equipment, and instructors. The attendance is nearly double what it was a year ago, and all of the laboratories are crowded far beyond their present capacity. The instructing force is entirely inadequate, all of the instructors having excessive hours and a larger number of students than it is possible to handle and do efficient work. Except for the possibility of securing more room for the department of Chemistry by the removal of agricultural work into another building, it would be imperative that a special building be provided for this department, or that students be excluded from the classes. To provide properly for the instructional work in Chemistry, and for the station laboratories, it will be necessary to use a large part of Agricultural Hall during the next two years; and, within a short time, this entire building will be required. To give reasonable relief, continuing as large classes as can possibly be handled to advantage, three additional instructors will be needed during the biennium.

Bacteriology.

The department of Bacteriology has devoted most of its energies to experimental work. The present room is sufficient for the accommodation of the students in this work, but additional equipment and assistance will be required.

Botany.

The work in Botany has been given in the same department with Forestry. The employment of a special instructor in Forestry, as previously suggested, with the necessary room and equipment provided, will also improve the conditions for the work in Botany.

Physics.

During the past year the work in Physics has been segregated from the departments of engineering, and placed in charge of a special instructor. The difficulties under which this work is being done are indicated by the fact that there are eight sections in laboratory work and six sections in recitation work, for all of which there is but one instructor with part time of a student assistant. Additional room and equipment, and at least two instructors, will be required during the biennium.

Other Departments.

A similar condition of congestion exists to a greater or less extent in the other departments of mathematics, English language and literature, modern languages, history, Latin, and drawing. These departments will require very little if any equipment, but are in great need of additional instructors and the necessary rooms for class purposes.

MILITARY SCIENCE AND TACTICS.

Number of Cadets.

During the years 1907-1908 and 1908-1909, the work in the Military department has been in charge of Commandant U. G. McAlexander, Capt. 13th Inf., U. S. A. During the year 1907-1908, the registration in this department was 733; and, on November 1, 1908, 780. The cadets are organized into four battalions of four companies each. The work has been most efficient in every particular. It is highly commended by Capt. Julius A. Penn, General Staff of the War Department, who inspected the work of the department in May, 1908.

The facilities, however, for the work in military tactics have become entirely inadequate. As reported by Captain McAlexander:

Armory and Drill Hall Required.

"The armory capacity is not more than one sixth of the requirements of the regiment and if the purposes of the War Department are to be carried out and the benefits of military instruction given to the young men of Oregon who are attending this College in large numbers, then it becomes imperative to increase the facilities for instruction. The first necessity is a large fire-proof drill hall and a sufficiently large armory to care for the equipment, and to furnish class and lecture rooms for necessary theoretical instruction. The walls of the drill hall should be built of re-enforced concrete and the roof of corrugated galvanized iron, and a dirt floor. This building should be about 120 feet wide and from 300 to 360 feet in length. The armory should be built in connection with the drill hall and should be a two-story structure, concrete walls, corrugated iron roofing, and provided with heat and light. This will be sufficient in capacity to accommodate 1,000 cadets."

Government Requirements.

The Congressional Act of 1862 makes it mandatory that provision be made for work in military science and tactics, but inhibits the use of any of the Federal funds for the maintenance of the Military department. In accepting the Act of Congress, the State assumed the responsibility of complying with its requirements. This Act, so far as it relates to the military work, is administered by the U. S. War Department. This department prescribes the kind and amount of work that shall be given, and it is necessary that the College conform to these requirements. But it is impossible to do so under present conditions. To quote again from the Commandant's report:

"The present facilities offer standing room only, a state of congestion destructive of every attempt at practical work, and rendering it impossible to comply with the requirements of the Government."

On account of the inclemency of the weather during a large part of the year, it is impossible to drill out-doors; and, since there is no room for drill under cover, it is imperative that a drill hall be provided sufficiently large for the work.

As explained in the Commandant's report, with the number of cadets now in the department, it will be very advantageous, and also a matter of economy, to arrange for the employment of a retired non-commissioned officer. His salary would not be more than $1,000 for the two years.

MUSIC.

Music Self-Supporting.

The School of Music is maintained without expense to the College, the director and instructors all being dependent upon the receipts from student fees for their compensation. The work of this school, however, is very important, not only because of the opportunity it gives students who are interested in music to get the training desired, but also because of its value in the social life of the institution. In addition to the individual work on the different instruments, and in voice, there are the military band of some 35 pieces, a chorus of 150 members, a college orchestra, two glee clubs, and a mandolin and guitar club, in all of which the students take great interest and are doing good work. Membership in these different organizations is free, the training afforded thereby being given to the students gratis. All instructors in Music, and the different musical organizations, give their services freely and without charge in furnishing music for the assemblies and for other College functions. The work of the school is very successful.

Musical Organizations.

PHYSICAL EDUCATION.

The department of Physical Education has been more fully organized and placed in charge of a specialist. The importance of regular, systematic, physical exercise, is now recognized in all institutions of higher learning. The following paragraph from Professor Angell's report states the case so completely that it is given here:

Students Need Systematic Physical Exercise.

"The demands of higher education require close application, and impose upon the boy or girl a sedentary life that would in many cases result in a weakened physique and a resultant physical inability to meet the problems of life that their mental training has prepared them for, unless these mental requirements are properly balanced by a normal amount of vigorous, recreative and healthful exercise. It is not a theory but a fact based upon comparative statistics showing that since the introduction of compulsory physical exercise in college curriculums, bodily vigor and physical health among American collegians has largely increased."

Out-door Work Encouraged.

The object in all of the different forms of athletics and out-door games, as well as in the regular gymnasium classes, is to have all the students participate in physical exercise of some kind under such regulations as will insure good health and symmetrical physical development. From measurements accurately taken and recorded, special work is prescribed for persons who are training to overcome physical defects. On account of the value of out-door work, students are encouraged to engage in all kinds of athletics, such as cross country running, track work, baseball, football, tennis, etc. To provide against danger from participation in athletic contests, all students are given a thorough physical examination to determine whether they have the physical ability to stand the strain of the vigorous exercise required.

The students maintain an athletic association which finances all competitive inter-collegiate athletics. For the support of this work each student pays to a general fund $2 per semester, of which 70 per cent is used for athletic purposes. With the receipts derived from intercollegiate games, this fund pays all expenses of athletic work, including equipment, salaries of coaches, traveling expenses of teams, etc.

Athletic Association.

Aside from the lighter games, such as tennis, and intersociety basketball contests within the institution, the work in physical education for women is confined to the usual gymnasium exercises, mostly along recreative and aesthetic lines, though special individual work is prescribed as required for corrective purposes.

Physical Training for Women.

LIBRARY.

During the past year the College Library has been moved from the first to the second floor of the Administration building. The room that was formerly used as an auditorium has been converted into a reading room. The two adjoining class rooms on the north are used temporarily for the stacks. The books have all been catalogued according to the Dewey decimal system, and are now classified and arranged on the shelves so that they are easily accessible. The Library is a Government depository and receives all the documents that are sent to libraries. As shown in the report of the Librarian, there are at present in the library upwards of 12,000 bound volumes, and about 10,000 pamphlets. The reading room has a seating capacity for only 108 readers, and is entirely too small for an institution of this size. Additional stack room will have to be provided. The importance of a new building in which adequate provision is made for the library work is discussed later in this report. While it will probably be impossible to get such a building during the next biennium, it will be very difficult to get along without it. In

Library Organized.

Needs of Library.

fact, it will be impossible to arrange for the library work the students should do. The order in the library is excellent, and the work in every way is most satisfactory.

NEEDS OF THE COLLEGE.

As already indicated in different parts of this report, there is urgent need throughout the College for more room, and for large additions to the equipment and to the instructing force, in order to relieve the present congestion, and to provide even partially for the increase in the enrollment and in the amount of work that will be required during the next biennium. Upwards of 30 additional class rooms, a number of important laboratories, and several offices, are absolutely essential in order to provide properly for the work. The following buildings are needed:

Horticultural Building.

1. HORTICULTURAL BUILDING. The necessity for this building and an explanation of its dimensions and construction are given on page 50. Architects have prepared general plans and they estimate that the building will cost $41,000. The greenhouses, complete according to plans, sufficiently large to accommodate the departments of botany, horticulture, and entomology, will cost from $10,000 to $12,000. It is thought, however, that the work of these departments can be temporarily provided for by the construction of certain sections of these houses at a cost of $4,000, making the total cost of the Horticultural building, with the glass houses required for present purposes, $45,000.

Room for Experiment Station.

2. THE CENTRAL AGRICULTURAL BUILDING. This building is to occupy the space between the Agronomy building and the proposed Horticultural building, being connected with these by closed passage ways. It will be of the same general style of architecture, constructed of concrete and brick, 140 feet by 78 feet, four stories in height. In this building

provision will be made for the Experiment Station offices, tabulating rooms, mailing and storage rooms, library, and fire proof vaults for storage of station records; for the offices, class rooms, museum rooms, etc., required by the departments of animal husbandry, poultry husbandry, irrigation and drainage, agricultural economics, agricultural extension, including movable schools and farmers' institutes; and an assembly room for the School of Agriculture, with a seating capacity of 500 to 600. The completion of this building will place the Experiment Station, and the instructional departments referred to, in a permanent home under very much more favorable conditions, with sufficient room for the work. By the removal of these departments from the old Agricultural Hall, the rooms thereby vacated can be utilized in providing the extension required for the work in dairying, and for the station and instructional work in chemistry, the urgent necessity for which is referred to under Miscellaneous Departments. The completion of this building will make it possible to arrange temporarily also for additional rooms required by the departments of English, history, mathematics, drawing, and industrial pedagogy. The architects estimate the cost of the building at $55,000. In this connection it may be explained that the new agricultural building really consists of four separate buildings—one for Agronomy, one for Horticulture, one for Dairy Husbandry, and the central part for the general departments given above. The plan is to have these buildings all constructed of concrete and brick, the purpose being to have them as inexpensive as possible, but substantial and convenient. The front elevation and general style of architecture are shown in the accompanying illustration.

Other Departments Provided For.

Agricultural Group of Buildings.

3. Armory and Drill Hall. The necessity for this building is explained in a previous paragraph on Military Science and Tactics. That the requirements of the U. S. War Department may be complied with and the appropria-

tions from the Federal Government not jeopardized, it is necessary that provision be made without further delay for the construction of this building. Although it is planned to have the building as plain in design as possible, consisting of bare walls and roof, without floor, it will unavoidably be somewhat expensive on account of its having to be so large; but it cannot be smaller and give the room required for the work. The architects estimate that it will cost $36,000.

Drill Hall.

4. AUDITORIUM AND LIBRARY. The present reading room has a seating capacity of only 108 persons. The stack rooms are at present over-crowded. Upwards of 1,000 volumes are received annually from the Government, in addition to the purchases that must be made from year to year to meet the needs of the students in the different courses. With an enrollment during the next biennium of upwards of 1,500, it is impossible that more than a very small percentage of the students can get any opportunity to use the library under present conditions. The importance of adequate library facilities in all of the work throughout the institution cannot be over-estimated. Furthermore, the only room in the institution that can be used for student assembly is the Armory. This room is not only unsuitable for the purpose of an auditorium, but it is now too small to accommodate the students. It is required for all of the indoor work in physical education, and at present it is also used for the storage of military equipment. In a large institution, no less than in a smaller one, there is great need for an assembly hall for lectures, concerts, convocations, commencement exercises, and other public gatherings, sufficiently large to accommodate all the students and faculty, with some room always for visitors. With the rapidity of the growth of the College, it would be unwise to provide an auditorium with a seating capacity of less than 2,500. In the administration of College affairs—in shaping student sentiment and in

Library Facilities Inadequate.

Auditorium Needed.

directing student activities,—an assembly room with sufficient capacity for the accommodation of the entire College community, is an absolute necessity. Provision for the auditorium and library should be made at the earliest date possible. However, it cannot be questioned that provision must first be made for the class rooms and laboratories required in the regular departmental work. And the other requirements that must be met at once are so great, that, badly as the auditorium and library building is needed, it seems unavoidable that the request for an appropriation for this building be deferred for the present.

Must Wait for this Building.

5. FOUNDRY AND WHEELWRIGHT SHOP. The necessity for this building is explained under Engineering and Mechanic Arts. It should be 41 feet by 132 feet, one story in height, constructed of concrete and brick, and should correspond in style of architecture with the Mechanic Arts building. The estimated cost is $11,000. In addition to the room required for the foundry and the wheelwright shop, provision can be made in this building, for the present at least, for the work in steam fitting, plumbing, and electrical construction. For this work, which comes in the elementary course in Mechanic Arts, there is great demand, and provision should be made for it as soon as practicable. This shop would also be of great value in the repair work in steam fitting and plumbing. By having an expert in charge of these subjects, he could also keep up the repairs throughout the College, with the assistance of students, and thereby save a large part of the amount otherwise required for this work. It may be necessary, however, on account of the expense, to get along temporarily without this building.

Plumbing and Steam Fitting.

6. HEATING PLANT. The heating plant has sufficient capacity for about one-half of the present College buildings. As shown in Professor Covell's report, Mechanical Hall, the Mechanic Arts building, the Administration building, the

Agricultural Hall, and the Armory and Gymnasium—the buildings which are connected with the heating plant—have a total radiation in square feet of 16,180; while Cauthorn Hall, Waldo Hall, the Agronomy building, and Shepard Hall, all of which are heated separately, together have a radiating surface of 14,690 square feet.

Heating Plant Inadequate.

The Pharmacy building and the Mining laboratory, which are heated by stoves, would bring the total heating radiation of the buildings not connected with the central heating plant above that of all buildings that are so connected. On account of the location of the present heating plant, it would be very expensive and in every way unsatisfactory to attempt to enlarge its capacity sufficient to provide heat for all the buildings. In fact, it would be impracticable to do so.

Buildings Heated Separately.

To have separate heating plants in the different buildings is objectionable in the extreme. In the first place, there is an element of danger from fire that should be avoided; besides the cost of heating buildings by separate plants is very much in excess of what it would be if the buildings were all supplied with heat from a central plant. For instance, in the report of the requirements for heating during the next two years, it is shown that the cost for labor in running the central heating plant is less than one-half that required in heating the buildings not connected with this plant.

Central Heating Plant Needed.

The best plan will no doubt be to begin at once a central heating plant, located near the southeast corner of the campus, in the vicinity of the present athletic field. This is the lowest point on the College grounds and to it there would be natural drainage from all the buildings. This location also has the advantage of being near the railroad so that fuel can be delivered directly from the cars. This alone would result in a saving at present of about $400 a year, and the amount would increase as the plant is enlarged. The building could be constructed on the panel, or sectional, system so that it could be extended from time to time as additional capacity is required. The plan is to provide for one unit at this time, with a capacity sufficient to heat the new agricultural buildings and the other buildings on the south half of the campus, and to continue the use of the present heating plant for power for the shops and for heating Mechanical Hall, the Mechanic Arts building, and the Administration building. Plans for the proposed plant have been carefully prepared and it is estimated that one section of the building, including re-enforced concrete stack, boiler with brickwork, piping and auxiliaries, with 800 feet of re-enforced concrete conduit 4 feet wide and 6 feet high, for the steam and water pipes, etc., will cost approximately $45,000. By omitting the concrete stack, however, and substituting an iron stack therefor, and by reducing the boiler capacity to what is absolutely essential during the biennium, with some other slight changes, the cost can be reduced to $35,000. Even this amount may seem large, but in reality it is not large when considered in connection with its importance to the institution and the amount that will be saved annually in the cost of heating the different buildings. It is small in comparison with what is expended by other institutions for similar plants. For example, three years ago the Iowa State College received an appropriation of $54,500 for a central heating plant. That institution, a year later, reported that this amount had proven "inadequate for even a partial construction of such a plant." Two years ago the Michigan Agricultural College, with a smaller attendance than the Oregon Agricultural College has, completed its central heating and lighting plant at a cost of $140,000.

Plan Proposed.

Cost of One Unit.

Comparative Cost.

LAND. The need for more land for experimental and instructional work in the different departments of agriculture is referred to on page 62 of this report. The probable cost of the land most needed for these purposes is given in the appended estimates of departmental requirements. Attention is also called to the absolute necessity of purchasing additional land for the campus. As shown on the accompanying map, there are five small plats of ground extending south and east, between parts of the campus west of the Administration building, east of the farm buildings and men's dormitory, and north of Waldo Hall. In order to join the parts of the campus referred to, and to secure suitable room for the buildings required, it will be necessary to purchase these tracts of land. The prices are continually advancing, so that it is important, not only as a matter of necessity but as a matter of economy, that arrangements be made to procure this land at the earliest possible date. There is another tract of land comprising six acres, lying just south of the athletic field and Waldo Hall, east of the farm, and adjoining the C. and E. Railroad on the south, that is very much needed in order to get a suitable location for the Armory and Drill Hall, the parade grounds, and the athletic field. The purchase of this land and the removal of the athletic field from its present location would also make room for the proposed central heating plant. Since the matter of negotiating for the purchase of land has been referred to a committee of the Board of Regents, no estimates are given here of the probable cost. The importance of obtaining the land, however, is presented for consideration in connection with the foregoing statements regarding other needs of the institution.

Land Needed for Buildings.

Athletic Field and Parade Grounds.

EXPERIMENT STATION. In addition to the room and equipment required for the experimental work, provision should be made for publications, and for the routine work referred to under Experiment Station. The Adams Fund cannot be used for publishing the results of the investigations made, and it is necessary to meet the expense of these publications from other funds. An annual appropriation of from $5,000 to $7,000 a year should be made for these purposes.

Appropriation Needed.

It is recommended that the Legislature make a special appropriation to the Station of the amount required.

General Improvements Needed.

IMPROVEMENTS. A number of improvements should be made during the biennium. These are given in detail, with estimates of the cost, in the Appendices. Among the most important are the following: to connect Cauthorn Hall with the sewer, in order to make proper disposition of the sewerage from this building; to equip a fire department, to be organized among the cadets as a precaution against loss in case of fire in any of the buildings; to finish the interior of the new barn, providing a seed room, and putting a cement floor in the root cellar; to lay a large drain pipe north and south across the campus, between the east entrance and the Administration building, in order to fill the large open drain ditch now used, and thereby provide additional room for military drill; to improve the campus in the vicinity of Waldo Hall and the Agronomy building, and the walks and drives generally; to move the frame building now used by the department of Horticulture to the poultry grounds; to provide a new fence for most of the farm; and to make such changes in the old Agricultural building as may be required in providing additional room for the science work.

Equipment.

EQUIPMENT. The necessity for more live stock, laboratory, and other equipment, has already been referred to under the several departments. An itemized statement of the requirements is given in the list of departmental estimates. In preparing their reports on the equipment required, the heads of departments had frequent consultations with the President, and the amounts were reduced as much as possible, the items listed including such only as must be had in order to do efficient work.

REPAIRS. The amounts estimated for general repairs include the usual items of painting roofs, replacing old steam pipes, repairing floors, painting woodwork, etc., in order to preserve the College property. As a matter of economy it is important that the buildings be kept in good repair. Many of the repairs contemplated for the next two years should have been made before; but, for want of funds, this has been impossible. The work cannot be delayed longer, however, without serious damage to some of the buildings.

Repairs.

MAINTENANCE. Beyond question, the greatest need of a growing modern institution is for an increasing maintenance fund. As a college develops, there is a continual increase in the amount required for instructors, and for such miscellaneous items of expense as repairs, heat, light, janitorial service, supplies, miscellaneous improvements, maintenance of grounds, clerical help, library facilities. For example, the Iowa State College in 1901 expended $4,000, in addition to the student janitorial fee, for heat, light, and janitorial service; in 1903, $8,350; in 1904, $12,572; in 1905, $16,000; and in 1906, $23,000. During 1906 the amount appropriated annually for repairs and improvements alone was increased from $18,500 to $30,000. The most pressing demand in the Oregon Agricultural College is for a much larger instructional force. For years the ratio of instructors to students has been much smaller than in other institutions. With the funds available, it has been impossible to increase the faculty as rapidly as the student enrollment has advanced. This deficiency is accentuated under present conditions by the large amount of advanced specialized work that is required in the different courses.

Rapid Increase in Maintenance Expense.

Larger Instructional Force Required.

The estimated requirements, as given in the Appendices, may be summarized as follows:

FOR MAINTENANCE.

(One year.)

Additional professors, instructors, and assistants, including Industrial Pedagogy, Veterinary Science, Irrigation and Drainage, and Highway Engineering	$47,775.00	
Heat, light, and power, maintenance of campus, janitorial service, furniture, night watchman, printing and advertising, telephone and telegraph tolls, water tax, etc.	27,628.50	
Maintenance of Library and purchase of books	6,225.50	
Departmental and General Repairs	6,848.00	
Miscellaneous supplies	4,027.50	
Miscellaneous improvements	1,914.75	
Present salaries, including all members of faculty, officers of Board of Regents, foreman heat and power plant, head janitor, assistant registrar, clerical help, etc.	75,135.00	
		$169,554.25
Less Income:		
Interest land-grant, Morrill Act, 1862	$11,500.00	
Morrill Act, 1890	25,000.00	
Nelson Act, 1907	15,000.00	
Student fees (on basis of an attendance of 1,500)	7,500.00	
State appropriation for maintenance	50,000.00	
		109,000.00
Balance		$ 60,554.25

Possible Reduction.

All of the items included in the above are needed. To keep the amount even as low as it is, no provision is made for any increase in salaries. However, the requirements from the Legislature are such in the aggregate, including buildings and equipment, that it seems unavoidable that a still further reduction be made. By reducing the number of instructors in some of the departments, and omitting the instructors in foundry and wheelwright work; and by reducing the totals listed for repairs and books, the aggregate amount can be reduced some $10,000. But at best it is absolutely essential, in providing even for a fair degree of efficiency in the work of the different departments, and in meeting the large increase in the expense for heat, light, power, and other things that cannot be reduced, that the Legislature increase the appropriation for maintenance at least $50,000 a year.

Appropriation For Maintenance Needed.

FOR EQUIPMENT AND IMPROVEMENTS.

(Two years.)

Departmental equipment	$80,614	
Miscellaneous equipment	9,208	
General improvements	9,995	
		$99,817

By following a course similar to that pursued in the reduction of the estimates for maintenance, and omitting all of the equipment listed for the foundry and wheelwright shop, the equipment for the fire department, and the amount required for draining the campus; and by an arbitrary reduction in the amounts listed for departmental equipment, probably the appropriation for equipment and improvements can be reduced to $60,000 for the two years. But there should be no further reduction in this amount.

In accordance with the foregoing, the requirements from the State Legislature, exclusive of land and the appropriation referred to above for the Experiment Station, may be summarized as follows:

For maintenance, an increase per year of		$ 50,000
For equipment and improvements, for two years		60,000
For buildings:		
Horticultural building and greenhouses	$45,000	
Central Agricultural building	55,000	
Armory and Drill Hall	35,000	
Central Heating Plant	35,000	
		170,000

If an equal amount should be appropriated each year for buildings, equipment, and improvements, the following would probably be the best division:

1909—		
Equipment and improvements	$35,000	
Central Heating Plant	35,000	
Horticultural building and greenhouses	45,000	
		$115,000
1910—		
Equipment and improvements	$25,000	
Central Agricultural building	55,000	
Armory and Drill Hall	35,000	
		115,000

These amounts in the aggregate may seem large; but they are really very conservative when compared with the amounts received for the same kind of work by other land-grant institutions. For instance, the total amount listed above for maintenance for the Oregon Agricultural College is $159,000. This amount in proportion to student attendance is less than the income of the Washington State College for maintenance by $84,000; the Iowa State College of Agriculture and Mechanic Arts, by $127,000; the Michigan Agricultural College, by $243,500; and Purdue University, by $72,000. The statistics for the Iowa State College of Agriculture and Mechanic Arts and the Michigan Agricultural College are for the year ended June, 1906. More recent reports of these institutions would show a larger proportionate increase in the maintenance fund.

From statistics compiled by the U. S. Commissioner of Education and by the Office of Experiment Stations, a table has been prepared which is of interest as showing the amount expended per student by each of a number of representative land-grant institutions.

Table showing income of agricultural colleges for each of the five years ended June 30, 1903, to 1907 inclusive; the average annual income, the average annual enrollment, and the average cost per student for each institution for the five years; the income, the enrollment, and the cost per student for each institution for the year ended June 30, 1907; also the average annual income, the average annual enrollment, and the average annual cost per student for all of the institutions for the five years; and the average income, the average enrollment, and the average cost per student for all of the institutions for the year ended June 30, 1907. The income in each case does not include appropriations for experiment station.

INSTITUTION	ANNUAL INCOME					1903 to 1907 Inclusive			FOR YEAR 1907		
						AVERAGE ANNUAL					
	1903	1904	1905	1906	1907	Income	Enroll-ment	Cost per Student	Income	Enroll-ment	Cost per Student
California, University of	$ 638,327	$ 930,919	$ 1,117,850	$ 1,050,191	$ 1,299,645	$ 1,007,386	3,255	$ 309.49	$ 1,299,645	2,987	$ 433.76
Colorado Agricultural College	146,930	119,305	116,048	147,766	125,699	131,146	505	259.70	125,699	604	208.11
Idaho, University of	98,398	53,804	78,295	60,000	172,750	92,649	357	259.52	172,750	363	474.24
Purdue University (Indiana)	219,610	243,917	329,790	303,343	328,592	285,050	1,630	174.87	328,592	1,820	180.54
Iowa State College	266,792	334,407	446,212	547,819	480,281	415,102	2,008	207.22	480,281	2,381	201.69
Kansas Agricultural College	113,331	213,357	151,834	203,030	236,535	183,618	1,655	110.94	236,535	1,937	122.11
Massachusetts Agricultural Col.	150,559	46,528	82,416	126,828	106,631	102,592	238	431.05	106,631	279	346.37
Michigan Agricultural College	226,425	238,900	244,865	288,600	370,292	273,816	947	289.14	370,292	1,001	369.92
Montana Agricultural College	60,112	69,386	65,844	57,838	106,235	71,883	347	207.15	106,235	372	284.50
Ohio State University	533,104	582,361	477,611	690,985	612,491	579,310	1,929	300.32	612,491	2,277	268.99
Oregon Agricultural College	76,807	64,147	63,943	68,023	112,511	77,086	664	116.09	112,511	833	135.06
Washington State College	111,533	110,356	117,110	127,837	337,330	160,833	844	190.56	337,330	1,100	306.66
Total						$3,380,471	14,379	$2,856.05	$4,288,992	15,954	$3,331.95
Average						$ 281,706	1,198	$ 238.00	$ 357,416	1,329	$ 277.66

Statistics for years 1903 to 1906 inclusive taken from reports of U. S. Commissioner of Education.
Statistics for 1907 taken from bulletin prepared by Office of Experiment Stations, U. S. Department of Agriculture, 1908.

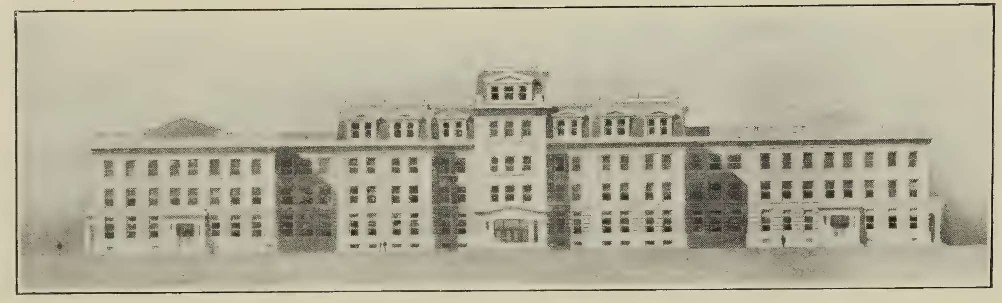
From this table it will be observed that the average cost per student during the five years was $238. The average for the year 1906-1907 was $277.66. On the basis of the average cost per student given in this table, the Oregon Agricultural College should receive during the next two years, in addition to the entrance fees and the income from the Federal Government, $790,800; on the basis of the income of the Michigan Agricultural College, in proportion to attendance, the Oregon Agricultural College should receive $1,097,200. It will be seen, therefore, that, should the Oregon Agricultural College receive the appropriations requested, for maintenance, equipment, improvements, and buildings, the aggregate would then be but 54 per cent of the amount it should receive on the basis of the average income per student of the institutions named in the above table; and only 39 per cent, in proportion to students, of the income of the Michigan Agricultural College. It should be remembered, also, that a large part of the appropriation requested for the two years is to be expended for buildings, equipment, and improvements, which will add to the permanent value of the plant, and should not, therefore, be charged against the students in attendance during the years for which the appropriations are made.

Respectfully submitted,

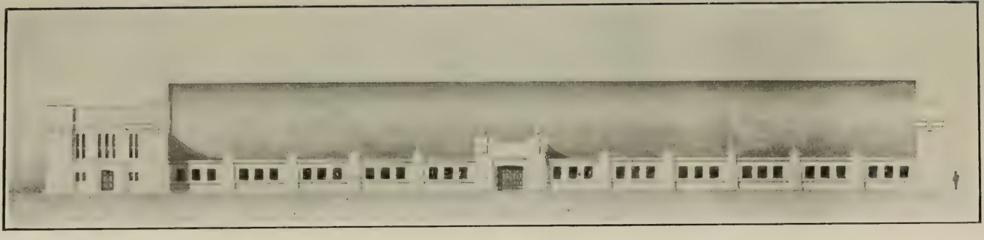
W. J. KERR,

President of the College.

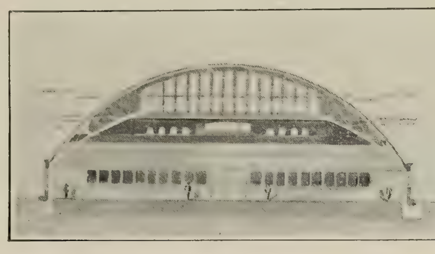
January 6, 1909.



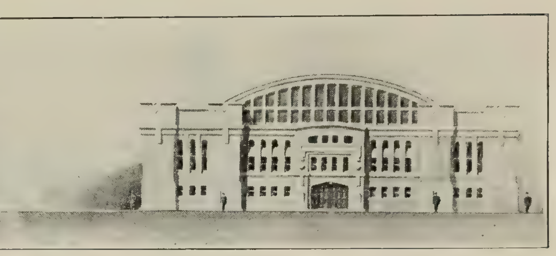
Proposed new Agricultural Building. The right wing, or Agronomy Building, is completed



Side View



Sectional View Showing Style of Roof



Front End View

Views of the proposed Armory and Drill Hall

APPENDICES

1—Report of the Dean of the School of Agriculture.

2—Report of the Dean of the School of Domestic Science and Art.

3—Report of the Dean of the School of Engineering and Mechanic Arts.

4—Report of the Dean of the School of Commerce.

5—Report of the Department of Forestry.

6—Report of the Department of Pharmacy.

7—Report of the Librarian.

8—Report of the Registrar.

9—Report of the Director of the Experiment Station.

10—Report of the Farmers' Institutes.

11—Report on Heat, Light, and Power.

12—Itemized Estimates of Requirements.

REPORT OF THE DEAN OF THE SCHOOL OF AGRICULTURE.

To the President of the College,

Sir: In accordance with your request I present, herewith, a report of the instruction in Agriculture during the years 1906-7, 1907-8, and 1908-9, together with recommendations for the School of Agriculture for 1909-1911.

The past two years have witnessed a remarkable development in agricultural instruction at the Oregon Agricultural College.

During the school year 1906-7, all of the instruction in agriculture was done by three men whose time and energies were necessarily very largely occupied by Experiment Station work, Farmers' Institutes, Winter Short Courses and correspondence.

Under such circumstances comparatively little instructional work could be given and no opportunity whatever could be provided for students who desired to specialize. But one course leading to a degree was open to agricultural students and in that course, in which 285 term credits were necessary for graduation, but 40 credits (14 per cent) in Agriculture were required, viz.: Animal Husbandry 15, Horticulture 10, Dairying 7.5, and Agronomy 7.5. In addition to the degree course, however, there were offered during the year a winter short course of two weeks and a special course of six weeks in Dairying.

Number of agricultural students enrolled 1906-7:

In degree course	80
In winter short courses	56
Total	136

Notwithstanding the fact that the enthusiasm of teachers and students for the work produced good results, it had long been evident that material additions must be made to the teaching force and to the facilities for instruction; and that the agricultural course must be thoroughly revised and expanded before it could be expected to attain the position which rightfully belongs to it in such an institution.

Upon assuming the duties of President, you recognized the above facts by recommending the establishment of departments of Agronomy, Animal Husbandry, Dairy Husbandry, and Poultry Husbandry, at once, and of Veterinary Science as soon as practicable. Two professors and one instructor were engaged, thus increasing the teaching force from three to six persons; and an Agricultural Committee was appointed, one of the duties of which should be to revise the courses of instruction. This was accomplished with the hearty co-operation of all members of the agricultural faculty and at the opening of the school year 1907-8, a small catalogue descriptive of the revised courses was ready for the use of students.

The course as adopted provided that of the 264 term credits necessary for graduation, 90 (34 per cent) may be for purely agricultural subjects in addition to those allowed for the foundation sciences.

During the year (1907-8) the various departments offered a total of 50 courses of instruction in agriculture with an aggregate of 169 term credits as compared with the 10 courses and 40 credits of the previous year.

It may also be of interest to note that when given the opportunity of electing such a large proportion of purely technical subjects all of the students not only made full use of it but most of them registered for more than the required number of credits.

In addition to the courses for regular students the following short courses were also offered during the year:

A Summer School of Agriculture for Teachers (1 week).
A Winter Short Course in General Agriculture (2 weeks).
A Winter Short Course in Dairying (6 weeks).
A Winter Short Course in Horticulture (6 weeks).

The number of agricultural students enrolled during the year 1907-8 in the various courses was as follows:

In Degree Courses	100
In Winter Short Courses	70
In Summer School of Agriculture	63
Specials in Agriculture	6
Graduates	3
Total	242

The Board of Regents, for administrative purposes, having authorized the grouping of the various departments of instruction into four schools, at the beginning of the year 1908-9 the following departments were organized into a School of Agriculture, viz., Agronomy, Animal Husbandry, Dairy Husbandry, Poultry Husbandry, Horticulture, and Entomology.

For the current year, 1908-9, the School of Agriculture offers the following courses:

1. A two years' course in Elementary Agriculture.
2. A four years' course leading to the Degree of Bachelor of Science.
3. A ten weeks' Winter Course in Dairying.
4. A six weeks' Winter Course in Horticulture.
5. A two weeks' Winter Course in Creamery Practice.
6. A Farmer's Week.

ELEMENTARY COURSE.

The two years' course which is offered this year for the first time is provided especially for those who have no opportunity to pursue their public school course beyond the eighth grade, or who, from necessity or choice, desire upon completing the work of this grade, to obtain as quickly as possible a working knowledge of the principles of agricultural science and practice. The technical instruction given during the course includes courses in Agronomy, Animal Husbandry, Horticulture, Dairy Husbandry, Botany, Physiography, Business Administration, Drawing, Woodwork, and Blacksmithing. Courses in English, Mathematics and

History are provided so that students who finish this course and who so desire may be fully prepared to enter upon the Degree Courses.

In this connection I desire to call especial attention to the opportunities offered by the technical portions of this course for teachers to prepare themselves to teach elementary agriculture in the public schools. Such persons, upon registering as special students, may be allowed to elect a full complement of courses in agriculture and thus be enabled to obtain a maximum of technical training in a minimum of time.

The course in Elementary Agriculture which is now being given for the first time is as follows:

	Semesters.	
First Year—	*First.*	*Second.*
English	5 credits	5 credits
Mathematics	5 credits	5 credits
History	3 credits	3 credits
Animal Husbandry	2 credits	
Agronomy	1 credit	1 credit
Horticulture	2 credits	2 credits
Dairying		2 credits
Drawing (Freehand)	2 credits	2 credits
Second Year—		
English	5 credits	5 credits
Mathematics	5 credits	5 credits
Animal Husbandry	1 credit	2 credits
Business Administration	2 credits	2 credits
Dairying	2 credits	
Agronomy		2 credits
Botany		2 credits
Physiography	3 credits	
Shopwork	2 credits	2 credits

DEGREE COURSE.

The Board of Regents having advanced the entrance requirements and the college year having been divided into two semesters, instead of three terms, as hitherto, it again became necessary at the beginning of the year to revise the degree course of study. Advantage was taken of this opportunity to strengthen the course materially by providing more work in the basic sciences without reducing the amount of work in agriculture. As finally adopted the course is as follows:

	Semesters.	
Freshman Year—	*First.*	*Second.*
English (Rhetoric and Classics)	5 credits	5 credits
Mathematics (Trigonometry)	3 credits	
Chemistry	4 credits	4 credits
Botany		3 credits
Zoology	3 credits	
Agronomy	3 credits	2 credits
Horticulture		2 credits
Animal Husbandry		2 credits
Shopwork	2 credits	2 credits
Sophomore Year—		
Physics	4 credits	4 credits
Modern Language	4 credits	4 credits
Economics		3 credits
Botany	3 credits	
Zoology	3 credits	3 credits
Agronomy		3 credits
Horticulture	3 credits	
Animal Husbandry		3 credits
Dairy Husbandry	2 credits	
Bacteriology	1 credit	

All of the work for the first two years is required and is the same for all agricultural students. To provide opportunity for specializing, students are allowed at the beginning of the junior year to elect a major and one or more minor subjects upon consultation with the head of the department in which the major is taken. Thus students who desire to specialize in Agronomy, Animal Husbandry, Dairy Husbandry, Horticulture, etc., may in addition to the general agricultural work of the first two years, devote a large proportion of their time during the last two years to subjects directly related to their chosen work, the various subjects being elected, however, on consultation with a member of the faculty. In this connection, however, it is interesting to note that in choosing their major and minor electives the students invariably select agricultural subjects or some closely related branch of science.

One hundred and forty-four semester credits are required for graduation from the course as now given, of which sixty-eight, or approximately fifty-seven per cent, may be taken in the various agricultural subjects. This is, however, a larger proportion of agricultural work than is usually recommended by the instructor under whom the student elects his major.

It should be noted that the various subjects of instruction may be conveniently arranged into the three following groups, each of which should require approximately one-third of the student's time: (*a*) sciences related to agriculture, *i. e.*, Botany, Zoology and Entomology, Chemistry, Physics, and Bacteriology; (*b*) technical agricultural subjects, *i. e.*, Agronomy, Animal Husbandry, Dairy Husbandry, Horticulture, Poultry Husbandry, and Veterinary Science; (*c*) non-technical subjects, *i. e.*, English Language and Literature, Mathematics, History, Economics, Modern Languages, Drawing and similar subjects.

The subjects of the first group are designed to furnish the student with an insight into the principles of the agricultural sciences. In the second group he learns of the application of these principles and also studies, both theoretically and practically, various subjects of agricultural technology. The subjects of the third group tend to further develop the student's intellect, broaden his view and train him in good citizenship. To indicate briefly the nature of the work, it may be stated that in the courses in Agronomy the student studies the origin, structure, fertility, cultivation, and improvement of various soils; the history, growth, culture, improvement, and value of the different field crops; the structure, machinery, drainage, and irrigation of the farm, and the history, economics, methods, and business principles of farm management. There is also a thorough course in Business Administration, which will be given by the department of Commerce. In the course in Animal Husbandry consideration is given to the history and characteristics of the various breeds of live stock; the principles of breeding; the principles and practices of feeding, with particular reference to conditions in this State; and by almost constant practice in stock judging the student is made familiar with the good points of the various breeds. In Horticulture the student studies the problems of the orchard and garden; such as choice of site, soils, planting, pruning, choice of varieties, sprays and spraying, and thinning; he obtains instruction and practice in the propagation of plants by various methods; in the harvesting, packing, storage and marketing of fruits; he may study the principles of plant breeding or the construction and management of greenhouses or the culture of small fruits and vegetables for market or canning purposes. In Dairy Husbandry he studies the secretion, composition, and separation of milk; the proper handling of milk and cream; and obtains abundant practice in the use of the Babcock and other tests, in butter and cheese making and in creamery practice. A department of Poultry Husbandry has recently been organized and offers to students exceptional opportunities to specialize along this line. The instruction will include a study of breeds, the principles of feeding, housing and incubation, and will be supplemented by practical work on the farm. The organization of a department of Veterinary Science has been authorized by the Board of Regents, but no course of instruction will be given during the school year, 1908-9.

The aim of the two and four years' courses is to train young men to become successful farmers, stockmen and fruit growers; to prepare them to become specialists in some branch of agricultural college or experiment station work, or to fit them to become teachers of agriculture in the public schools. In short, they offer, to those who have faith in the farm and in rural life opportunities for intellectual development and technical training equal to those provided for education for other professions.

The various departments are offering the following courses of instruction.

	Semesters.	
	First.	*Second.*
Agronomy—		
1. Soils	1 credit	1 credit
2. Crops		1 credit
3. Mechanics		2 credits
4. Basic Agronomy	3 credits	
5. Crop Production		2 credits
6. Irrigation and Drainage		3 credits
7. Soil Physics	5 credits	
8. Cereal Crops	5 credits	
9. Farm Mechanics		5 credits
10. Climatology		2 credits
11. Soil Fertility	5 credits	
12. Agrostology	5 credits	
13. Farm Management		5 credits
14. Advanced Work	5 credits	5 credits
Animal Husbandry—		
1. Breeds of Farm Animals	2 credits	
2. Veterinary Science		1 credit
3. Care of Farm Animals		2 credits
4. Breeds of Stock		2 credits
5. Stock Judging		3 credits
6. Market Types	3 credits	
7. Market Types		3 credits
8. Herd Management, Range and Farm		2 credits
9. Principles of Breeding	4 credits	
10. Stock Feeding	5 credits	
11. Beef Production		1 credit
12. Pork Production		1 credit
14. Mutton and Wool Production		1 credit
15. Research Work		3 credits
Dairy Husbandry—		
1. Farm Dairying		2 credits
2. Farm Dairying	2 credits	
3. Milk and Cream Testing	2 credits	
4. Advanced Butter Making	5 credits	
5. Cheese Making		3 credits
6. Research Work	2 credits	
7. Factory Management	3 credits	3 credits
8. Technology of Milk		2 credits

9. Preparation of Ice Cream and Ices	1 credit	1 credit
10. Thesis		2 credits
11. Home Dairying		3 credits

Horticulture—

1. Elementary Orchard Practice	2 credits	
2. Elementary Plant Propagation and Vegetable Gardening		2 credits
3. Plant Propagation		2 credits
4. Orchard and Garden Practice	3 credits	
5. Practical Pomology	3 credits	
6. Orchard Practice	2 credits	
7. Orchard Practice		2 credits
8. Floriculture	2 credits	
9. Grape Growing	2 credits	
10. Small Fruit Culture		3 credits
11. Nut Culture		2 credits
12. Landscape Gardening		2 credits
13. Systematic Pomology	2 credits	
14. Commercial Pomology	2 credits	
15 and 16. Seminar	1 credit	1 credit
17. History and Literature of Horticulture	2 credits	
18. Plant Breeding		4 credits
19. Sub-tropical Pomology		2 credits
20. Principles of Vegetable Gardening	4 credits	
21. Greenhouse Construction		3 credits
22. Forcing Vegetables	4 credits	
23. Systematic Olericulture	1 credit	
24. Truck Gardening		5 credits
25. Annuals and Perennials	3 credits	
26. Forcing Flowers		4 credits
27. Plant Materials	2 credits	
28 and 29. Theory and Design	3 credits	3 credits
30. Field Practice in Landscape Gardening		2 credits
31. Floriculture	3 credits	
32. Landscape Gardening		3 credits
33. Vegetable Gardening and Small Fruit Culture		3 credits

Poultry Husbandry—

1. Poultry Husbandry		2 credits
2. Poultry Management		2 credits

Zoology and Entomology—

4. Anatomy and Physiology of Domestic Animals	3 credits	3 credits
6. General Entomology	5 credits	
7. Advanced Entomology		5 credits
8 and 9. Advanced Entomology	5 credits	5 credits
10 and 11. Crop Pests	3 credits	3 credits
12. Animal Parasites		1 credit

There are thus being offered during the present year a total of eighty-three courses of instruction in agricultural subjects with a total of two hundred and forty-three semester credits. This is nine times the amount of instruction in agriculture that was being given at the beginning of the biennium covered by this report. It should also be noted that the opportunity for work in Bacteriology, Botany, Chemistry, Physics, and Zoology, subjects which form the basis of agricultural science, has also increased in like proportion but is not included in this report since the departments in which this work is given are not included in the School of Agriculture.

The number of agricultural students registered to date (December 1, 1908), in the various courses is as follows:

In Degree Course	127
In Elementary Course	34
Specials in Agriculture	9
Total	167

The increase in the number of regular students registered to date is thus 53 per cent over the total for last year.

INCREASED FACILITIES NECESSARY.

Notwithstanding the fact that the instructing force has been increased during the biennium from three to ten persons and that to the facilities for instruction have been added a well equipped poultry plant, a splendid Agronomy building, which contains some of the best equipped laboratories for work in Agronomy to be found in this country, and an attractive and well equipped dairy barn, the increase in the facilities for instruction has not kept pace with the development of the work. The room available for instruction purposes has approximately doubled, the teaching force has trebled, while the amount of instruction given has increased nine-fold.

REQUIREMENTS BY DEPARTMENTS.

Agronomy.

When installed in the new Agronomy building, this department will be well provided for, having what are probably the best laboratories of the kind in the West, if not in the whole country. Sufficient space is not available in this building, however, to house the machinery used in the course in Farm Mechanics and eventually a separate building may be needed for that purpose, although, for the present, one wing of the dairy barn may be used.

Another instructor for the department is necessary. At present the management of the College farm, the experimental work with soils, cereal crops, forage crops, irrigation and drainage, a heavy correspondence, and more than thirty semester hours of instruction per semester fall upon the head of the department and one assistant. By reason of the broad range and fundamental nature of the subjects taught under the name of Agronomy, this department should be provided with a sufficiently large instructing force to make it one of the strongest in the institution. In some other institutions, the subjects taught in our department of Agronomy are assigned to several departments, each with a much larger instructing force than has our own. For the present, however, the work can be provided for by employing one additional instructor.

Animal Husbandry.

In presenting the needs of this department I can do no better than to quote from Dr. Withycombe's report:

"There has been an increase of 44 per cent in the number of students in the department of Animal Husbandry this year and at this rate of increase it is reasonable to presume that there will be at least 200 regular students taking work in the department in 1911.

"Agriculture is the basic wealth of this state and the live stock industry is the very foundation of successful agriculture. Thus any reasonable amount of money invested to promote a greater interest in this great industry is certainly money well expended.

"The real needs of the department are, first, more first-class live stock; second, additional class rooms and another instructor; third, a judging pavilion. By far the greatest present need is more live stock. The College and Station has a good herd of Jerseys and Shorthorns, Yorkshire and Berkshire swine, and a good flock of Cotswold and Shropshire sheep. But for thorough work in Animal Husbandry there should be a greater number of breeds represented so that students can have a much wider range of work and become familiar with practically all of the leading breeds of stock."

The judging pavilion, while it is greatly needed, can, as intimated by Dr. Withycombe, be dispensed with for the present; but the large number of students electing work in the department makes the employment of another instructor almost imperative, and the magnitude of the live stock industry in the state, with the great importance of the work given, should certainly justify the expenditure of at least $5,000 for good types of a number of breeds not now represented in the College herds.

Dairy Husbandry.

As soon as possible a dairy building should be provided for the department of Dairy Husbandry. The present quarters are not only already crowded to the limit, but are entirely unsuited to the work. Professor Kent calls attention to the fact that "refrigeration in modern creamery practice calls for machinery that could not be properly installed" in the present quarters. "The sewerage arrangements at the present time are very undesirable; the heating conditions are objectionable, for the pipes for the entire Agricultural Hall pass through the main work room, thus overheating it when it should be cooled; the cheese-curing rooms do not afford proper control of temperature and moisture; and the close proximity of a chemical laboratory further adds to the unsuitable location of the present quarters."

A building suited to the needs of the department—one that would give "opportunity for proper instruction in milk and cream testing, butter making, cheese making, market milk, farm dairying, cream refrigeration, ice cream making, etc., etc., along practical commercial lines and including the operation of a commercial creamery" should, when fully equipped, cost not less than $65,000.

Such a building would enable the Oregon Agricultural College to conduct the best dairy school west of the Rocky Mountains, and would be a proper recognition of the greatest single industry of the state.

While such a building is greatly needed and must be provided before the dairy courses can be developed to a high standard, I believe that in the interests of economy we should for the present do the best possible with the present quarters and equipment. I would recommend, however, that as soon as the department of Animal Husbandry can be properly equipped with live stock, the entire management of the dairy herd be transferred to the department of Dairy Husbandry.

Horticulture.

The department of Horticulture is well provided with instructors; and is doing good work. The facilities for instruction, however, are very poor. With the most meager office and class-room accommodations; with no spray laboratory, propagating rooms, packing-room or storage facilities; with practically no greenhouse facilities; with but a small orchard and no propagating grounds, the work of the department is seriously handicapped. I believe that it is due to the large number of students who are specializing in horticulture as well as to the horticultural interests of the state that a suitable appropriation be made by the incoming legislature to provide this department with the necessary building, greenhouses, and land for orchard purposes. A horticultural building suitable for the work and with adequate greenhouse facilities could be built, probably, for about $60,000. Not less than $5,000 should be invested in orchard lands. Even then the acreage available for orchard purposes would be far less than at many similar institutions in other states, some of which have horticultural possibilities greatly inferior to those of Oregon.

Poultry Husbandry.

The department of Poultry Husbandry is well equipped. Some assistance in teaching may be necessary and several additional rooms are needed for various purposes. I believe, however, that satisfactory quarters can be provided for all of the work without the erection of an additional building.

Veterinary Science.

During the past two years a number of students have applied for registration in a course in Veterinary Science. In view of the great importance of the live stock and dairy industries to the state and particularly in view of the rapid increase in the number of highly bred animals in the state—animals which it is to the state's interest to protect, I believe provision should be made to at once organize a course in Veterinary Science at this institution.

Respectfully submitted,

A. B. CORDLEY,
Dean of the School of Agriculture.

REPORT OF THE DEAN OF THE SCHOOL OF DOMESTIC SCIENCE AND ART.

To the President of the College,

Sir: In July, 1908, the department of Household Science was re-organized as the School of Domestic Science and Art, and placed under the direction of a Dean, who also has the management of Waldo Hall, the women's dormitory. To assist the Dean in the work of instruction, three instructors were employed as follows: Marian S. Van Liew as instructor in cookery, serving, dietetics, marketing, and laundry work; Helen H. Tobin, to teach plain hand and machine sewing, dressmaking, tailoring; Ariel Ewing, for the work in house construction, household decoration, hand work, basketry, weaving, and millinery. However, on account of the large increase in attendance and the consequent increase in the amount of work called for, it was found necessary in November to employ another instructor to assist in the work of cookery, and Myrtie Van Deusen was secured for this work. The two instructors in cookery make it possible to carry out an excellent plan for this work in connection with the dormitory, as these instructors have charge of the catering, marketing, and the general oversight of the kitchen, pantries, and dining room, the cooks and waitresses being responsible to them. This makes possible a valuable co-operation between the work of the department and the dormitory.

The enrollment in the household science work has increased very materially during the last two years. In 1906-1907, there were registered in this department 81 students; in 1907-1908, the total registration was 155, including 29 students in the winter course; while, on November 1, 1908, there are in all 177 students registered in the School of Domestic Science and Art, and there will no doubt be from 30 to 50 register for the work in the winter course. The students during the present semester are distributed as follows: elementary, 19; freshmen, 62; sophomores, 34; juniors, 22; seniors, 19; and post-graduates and specials, 21. During the year 1909-1910, it is estimated that 200 students will pursue the work of this school; and 225 during the year 1910-1911.

During the present semester there are being offered 13 different courses, in 27 sections, with a total of 554 students, as follows:

Course.	*Students.*	*No. of Sections.*
Principles of Cookery	116	5
Advanced Cookery	35	3
Plain Sewing	99	4
Dressmaking	30	2
Tailoring	11	1
Millinery	47	2
House Construction	34	2
Basketry and Weaving	21	1
Costume and Design	4	1
Nature Study	110	3
Bacteriology	23	1
House Sanitation	16	1
Normal Methods	8	1

During the semester the students have been given theoretical and practical instruction in the cleaning, management, and arrangement of the kitchen; in the preparation of special dishes for use in the dormitory dining room, such as breads and the more common foods, puddings, salads and dressings; in the canning and preserving of different kinds of fruits, jellies, jams, etc. They have also been given instruction and training in the preparing and serving of meals. The plan of the work for students who have studied cookery one year has been to give them an opportunity to review operations, to gain facility, and to show their need in such work, at the same time to introduce new ideas and operations, and to extend their knowledge to an appreciation of wise selection and combination of foods, giving consideration to both the dietetic value and the cost, as well as to the taste and attractiveness. With this purpose in view, the class planned, cooked, and served a number of meals, the type of which is illustrated by the following menus: supper prepared for 13 people, consisting of beefroll, French fried potatoes, escalloped tomatoes, baking powder biscuits, apple charlotte, hard sauce, and tea, the total cost being $1.75, or 14 cents per capita; luncheon for 14, consisting of tomato bisque, crautons, macaroni with cheese, corn bread, and cocoa, total cost $1.32, or 9.4 cents per person; luncheon for 14, consisting of stuffed peppers, creamed potatoes, raised biscuits, celery, apple salad, and tea, at a total cost of $1.17, or 8.3 cents per capita. These same students will plan menus for all types for people in health and in sickness, for family and for dormitory use, calculating the exact cost and dietetic value, considering also the best season for purchase time, and the difficulties of preparation and keeping qualities.

In Domestic Art students are given work in plain sewing for both hand and machine, drafting, making of undergarments and simple dresses; dressmaking and tailoring, designing, cutting and in making costumes for various occasions, including tailored suits, tea and evening gowns, etc. Special consideration is given to costume design and other important factors which should determine the selection and planning of a wardrobe, with sketches of gowns and hats for various occasions. Other work in this department includes lectures and recitations on principles of house furnishing, considering first the house as a whole and then the various rooms, making practical applications by furnishing different rooms in Waldo Hall, with specal consideration for arrangement for both convenience and beauty, selection of materials for furnishings, woodwork, papering, furniture, rugs, curtains, colors, appropriateness, expense, etc.

In the science work in the School of Domestic Science and Art special attention is given to an appreciation of the reality of bacteria and allied organisms such as yeasts and moulds, their function in the world, their place in nature's food cycles, their agency in disease, the dependence of real cleanliness upon them, how their growth may be encouraged when desired or discouraged or prevented entirely; also a consideration of such problems as the best and least expensive methods of heating, ventilating and lighting, good plumbing and systems for supplying hot and cold water and carrying away of waste water, all instruction, so far as possible, being supplemented by practical application and a thorough understanding of the fundamental physical and bacteriological principles involved.

However, these courses offered by the School of Domestic Science and Art would not be at all adequate to give a thorough and broad education unless strengthened by good courses in English, history, mathematics, art, and the natural sciences. An intelligent study of cookery, must be based upon a scientific knowledge of the sciences such as chemistry, physics, physiology, and bacteriology, while sewing and all domestic art work must be based upon thorough training in art principles. Therefore, the curriculum planned for the school includes extended academic work as well as the practical work. High ideals, skill in manipulation, time saving methods, are emphasized in all of the work. Classes in cookery are taught the preparation of all common foods with a thorough study of the underlying principles involved in the processes of cooking and in the combining of various foods to give proper nutrition in health at different ages and under different disease conditions. Menus are suggested, cooked, served, eaten, and criticized by the students. Through class and practical work the student learns the best methods of work for obtaining real cleanliness throughout the home, house cleaning, laundry work, and personal hygiene receiving a careful consideration based upon bacteriological principles.

In the work in domestic art the student should learn and be interested in making dresses and hats for various occasions. The work itself should show appreciation of constructive art principles and high ideals in technique. Other forms of work, such as art needle work, basketry and weaving, enable the student to gain muscular control, guided by careful thought, and to produce useful and beautiful articles; while the work in house construction should enable her to know what is desirable and beautiful in a home and to help her to see the possibility of having an artistic, convenient, and inexpensive house surrounded by trees, flowers and vegetable gardens, making, as a whole, an attractive home—a valuable addition to any community.

The work of the school should enable a woman to reach her greatest possibilities along the line of her natural and life directed interests, to develop and broaden the interests of a well furnished mind, to secure perfection in technique in the production of suitable and beautiful articles—the material furnishing of a life of culture. The course of study offered in the school should make of the young woman we graduate not only a woman of culture, but she should know, and be interested in knowing, the influence a well ordered daily life has upon happiness and usefulness in the world. She should know how to make a home beautiful in arrangement and furnishing, and be interested in making it so. She should know what foods, what quantity and preparation, is best, in health and in sickness, for both infants and mature people. She should be a power for good, holding high ideals, ready, able, and willing, to help in advancing her community to its greatest possibilities; and the advanced work should enable her to cope successfully with the problems of professional work for which the courses are planned,

Respectfully submitted,

JULIET GREER,

Dean of the School of Domestic Science and Art.

REPORT OF THE DEAN OF THE SCHOOL OF ENGINEERING AND MECHANIC ARTS.

To the President of the College,

Sir: In submitting my first report as Dean of the School of Engineering and Mechanic Arts, 1 am reminded that this report must largely consist of an outline of plans for the future instead of a record of past achievements.

The school organization includes all of the work in the departments of Engineering and Mechanic Arts. Four distinct courses leading to the degree of Bachelor of Science in Engineering are given as follows: (1) Civil Engineering, (2) Electrical Engineering, (3) Mechanical Engineering, (4) Mining Engineering; (5) also a two-year course in Mechanic Arts not leading to a degree.

These departments are all in a flourishing condition, so far as attendance of students is concerned. However, the growth of the College has been so rapid during the past few years that the engineering departments have not been able to provide equipment and teaching force rapidly enough to supply the increasing demands.

The growth has been most marked during the past three years, when the number of students enrolled in engineering courses and in Mechanic Arts has increased from 199 in 1906-7 to 444 in 1908-9,—a gain of 123 per cent. Also in 1906-7 the engineering students constituted 23.9 per cent of the total registration; in 1907-8, 31.3 per cent, and now 41.8 per cent of all students enrolled in the College are in the School of Engineering and Mechanic Arts.

The distribution among the several courses is as follows: Civil Engineering, 108; Electrical Engineering, 157; Mining Engineering, 50; Mechanical Engineering, 76; Mechanic Arts, 53; total, 444. Each of these departments has its legitimate place in the educational work of the College and in the industrial development of our commonwealth.

CIVIL ENGINEERING.

In the development of a comparatively new country like the Pacific Northwest, no branch of engineering skill is called upon oftener than that of civil engineering. The surveying, platting and dividing of vast areas of field and forest; the location and construction of wagon roads; the building of steam and electric roads; the draining of swamp or low lands; the irrigation of arid lands, are some of the processes that demand engineering skill at the very outset. Later, with the building of cities and towns comes the further applications of the principles of civil engineering in municipal and sanitary engineering; in designing and constructing water and sewer systems; in paving streets, building bridges, and developing water power. Manifestly, the agricultural and industrial development of a country are very closely associated with the work of the civil engineer.

At the meeting of the Board of Regents in July, 1906, the preliminary steps were taken for the organization of the course in Civil Engineering, but owing to the very limited teaching force and the inadequacy of funds at command very little more was done than to make a beginning. A year later Civil Engineering became a department and since that time its growth has been almost phenomenal. The following is an exhibit of the instructional work being done in the department of Civil Engineering for the year 1908-1909:

Subject	*Course No.*	*Credits*		*Students*	*Sections*
		1st Sem.	*2d Sem.*		
Sanitary Engineering	12	3		4	1
Roofs and Bridges	10	4		2	1
Roofs and Bridges	11		4	2	1
Highway Construction	8	5		14	1
Masonry & Foundations	9		5	14	1
Irrigation Engineering	14		4	1	1
City and Topographic Surveying	5	3		20	1
Railroads	6	1		21	1
Railroads	7		5	21	1
Agricultural Surveying	3		3	10	1
Surveying	2		5	70	3
Seminar	16&17	1	1	13	1
Engineering Contracts and Specifications	15		1	8	1

ELECTRICAL ENGINEERING.

No branch of engineering has made more rapid or extensive advancement during the last twenty years than electrical engineering. Electricity in the home has ceased to be a luxury, enjoyed only by the wealthy dweller in the city, and has become a necessity even in modest homes throughout our land. Nothing offers greater inducement to the residents of cities to establish homes in the country than the numerous interurban electric lines binding together our cities and towns. Our state has exceptional advantages for the development of electric power. Rapid mountain torrents fed by perpetual snows are available in nearly all parts of the state for the cheap production of electric current. There is power enough of this kind, now going to waste, to operate a network of electric roads covering the entire state; and to do much of the drudgery in thousands of homes that is now done by hand. The development of this asset will do much towards the advancement and prosperity of the whole state. It is the special province of the electrical engineer to extend the use of this subtle agency and bring it within the reach of all.

The following is an exhibit of instructional work being done in the electrical department for the year 1908-1909:

Subject	*Course No.*	*Credits*		*Students*	*Sections*
		1st Sem.	*2d Sem.*		
Dynamo-Electric Machinery	1& 2	3	3	36	2
Elements of Electrical Engineering	3& 4	3	3	28	1
Dynamo Design	9&10	3	3	28	2
Electrical Engineering Laboratory	7		2	28	5
Power Plants	10	3		5	1
Power Plant Design	11		3	5	1
Electrical Laboratory	5& 6	2	2	36	5

MECHANICAL ENGINEERING.

The people of this and adjoining states are still content to ship vast quantities of manufactured goods across the continent, paying heavy tribute to the railroads for freight charges, instead of building up home manufacturies. It is to be expected that development along this line will be somewhat tardy since a country must be well settled before there is a great demand for manufactured products. Some progress has been made in manufacturing industries, but very little compared to future possibilities. It is the purpose of the course in mechanical engineering to fit young men to take an active part in this work. The design of machines; study of engineering materials; the economical production of power by steam or gas engines; the installation and operation of complete plants, are some of the things with which the mechanical engineer is expected to be familiar.

Following is an exhibit of the work being done in the department of Mechanical Engineering and Mechanic Arts for the year 1908-1909:

Subject	*Course No.*	*Credits*		*Students*	*Sections*
		1st Sem.	*2d Sem.*		
Woodwork	19&20 &21	3	3	192	5
Woodwork	22&23	5	5	53	1
Blacksmithing	28&29	3	3	72	3
Blacksmithing	32		2	53	2
Machine Shop	35&36	3	3	50	3
Mechanical Drawing	3	3	3	93	3
Mechanical Drawing	1		3	107	3
Descr. Geometry	2	3		90	3
Mechanism	4		4	25	2
Materials of Engineering	8	2		29	1
Statics and Dynam.	5	4		52	2
Strength of Materials	6		2	52	2
Hydraulics	7		2	52	2
Machine Design	13&14	4	4	11	1
Engineering Lab.	11&12	2	2	18	3
Steam Machinery	10		2	60	2
Enginery	9		2	10	1
Thermodynamics	15	3		5	1
Internal Comb. Motors	16		2	5	1
Steam Turbine	17		2	5	1
Hydraulic Motors	18	2		7	1

MINING ENGINEERING.

No one can doubt the need for training in the principles of mining engineering in a country where there is so much hidden mineral wealth as in our own state. We also stand at the very portals of that great storehouse of mineral wealth—Alaska.

There are also great possibilities along the lines of development indicated by economic geology. The location and opening of quarries of building stone; the manufacture of Portland cement; the making of various kinds of brick, call for a knowledge based upon the principles taught in this department. The student is also taught the principles of scientific prospecting, mine surveying and assaying.

Following is the exhibit of work now in progress:

Subject	*Course No.*	*Credits 1st Sem.*	*Credits 2d Sem.*	*Students*	*Sections*
Mineralogy	1 & 2	4	4	21	2
Geology	3	3	4	46	2
Excavating & Tunneling	7	2		2	1
Metallurgy of Iron and Steel	14	3		7	1
Mine Surveying	8	2		14	1
Seminar	16	1	1	18	1
Fire Assaying	12		4	20	1
Mining	9		3	12	1
Mining Law	11		1	12	1
General Metallurgy	13		4	15	1
Metallurgy of Copper	15		4	10	1

MECHANIC ARTS.

The courses in Mechanic Arts were planned to help those who desire to enter the skilled trades as craftsmen. The decay of the apprenticeship system has made it extremely difficult for young men to gain a working knowledge that will enable them to enter their chosen line of work. The demand for an education of this kind has been recognized in the older and better developed industrial centers of our country for years, and various methods have been tried to satisfy the demand. The latest movement seems to be the building of great technical high schools where students can learn the underlying principles of a trade and at the same time receive the fundamentals of a sound education. Mr. George H. Martin, secretary of the Massachusetts State Board of Education, in defining the place and function of such a school in our educational system, says: "The work of the school will be three-fold: (a) To furnish technical knowledge and technical skill; (b) to promote intelligence, breadth and refinement of a cultural sort; (c) to develop a sense of civic obligation."

The course in Mechanic Arts has for its purpose the training of mechanics rather than engineers. We are confident that there are many young men who cannot afford to take a four-year course in engineering, but who desire to enter industrial work as skilled artisans. We believe that such persons would be greatly benefited by a two-year course in this department, where they receive careful instruction in handicraft and at the same time broaden their general education by taking work in English, mathematics and general science.

In our state this matter has received scant attention, although the time is now ripe for the development of this branch of our education, if we would give the people what they desire. It seems eminently fitting that the State Agricultural College should pioneer the way in this matter since a large part of the present equipment and teaching force are readily adapted to the work. A beginning was made this year when a two-year course was offered with the leading industrial courses in woodwork including carpentry, cabinet making and pattern making; and in iron work, blacksmithing, plumbing and pipe fitting. The result seems to justify the action since there are now 53 students taking the first year of this work. The principal is a broad one and if it succeeds, several other courses will be required in addition to those now offered.

The crying need of all departments is larger equipment and more teaching force. Just how far these requirements can be met in the near future is a matter of grave concern to us at this time. We fully realize that many other departments of the College are in similar circumstances, and further that a sum of money sufficient to meet all of the requirements would be so large that even a friendly legislature and a liberal minded public would find it very difficult to grant the appropriation. In view of these facts, our estimates for the next two years are based upon actual necessities rather than the needs of the departments.

ADDITIONAL REQUIREMENTS.

During registration this year some inquiry was made for work in Architectural drawing and design. The school at present has nothing to offer along this line, and very likely it is not expedient to consider the establishment of such a course at present. However, as the country develops there will no doubt be a field of work in Architecture and structural engineering which will demand recognition.

ENGINEERING LABORATORY.

In planning the future work in engineering, there is evidently one feature that should be developed before all others. I refer to the engineering laboratory and the facilities which it affords for research work and commercial testing. Its usefulness would not be limited to mechanical engineering alone but would include the whole school of engineering with the possible exception of electrical engineering which has its own special laboratory. The main features to be provided for are: (a) The testing of the strength and fitness of the materials used in engineering and building construction; (b) tests of the heat values of the natural and artificial fuels; (c) tests of the useful qualities of lubricating oils and anti-friction bearings; (d) tests to determine the efficiency and economical working of steam engines and boilers, steam turbines, gas engines, water wheels and other prime movers. In fact, the engineering laboratory should afford facilities for the student to come into contact with actual engineering problems and to work out the solutions in a concise and businesslike manner.

What has been said of the general engineering laboratory is true of the electrical laboratory, so far as the inadequacy of the present equipment is concerned. It is only with the greatest difficulty that students can be given work in these two laboratories on account of lack of facilities.

The engineering laboratory should be provided with a large testing machine of 200,000 pounds capacity, for testing beams of full size, but on account of the expense of installing such a machine it is omitted from our estimates at this time. The Mining department should have a complete ore testing plant, equipped with modern machinery sufficient to determine the most efficient method of milling any individual ore. The Civil Engineering department needs more instruments and more assistants to take care of the rapidly increasing number of students who are choosing this branch of engineering work.

SHOPS.

The College shops have been greatly improved during the last year by better quarters afforded by the new Mechanic Arts building and by additional equipment purchased for the wood shop and blacksmith shop. A power hammer is needed in the blacksmith shop and more lathes and hand tools in the wood shop before these shops are equipped as planned last year. The Machine Shop is greatly in need of lathes and other tools. It is now the most meagerly equipped of the three shops. A foundry is now the most important part of the shop department for which provision has not been made. It correlates the work of the wood shop and machine shop. In fact no college shops are complete without a foundry where students can study moulding and casting. The addition of a foundry under the direct supervision of a practical and capable man would be of great benefit, not only in supplying the demand for this kind of instruction but it would also enable the shop department to procure castings for machines and apparatus to be added to the equipment. With each shop under the supervision of an expert practical foreman, there is no reason why a great deal of apparatus for the shops and engineering laboratories should not be designed and built in the shops.

A wheelwright shop is another important adjunct to our shop department which should be added as soon as money is available for that purpose. The equipment is not very expensive, besides, a part of the old blacksmith shop equipment might be utilized. This shop and foundry might be housed in one building similar in design and construction to the other shop buildings.

TEACHING REQUIREMENTS.

The higher requirement for entrance to the regular degree courses, established last year and taking effect next September, has greatly strengthened these courses by placing many strictly engineering studies in the senior year where they will be required for graduation for the B. S. degree. Heretofore only those who took a post-graduate course could obtain much of this important professional work.

The effect has also been to greatly add to the instruction work of the heads of departments, as a careful study of the exhibits given elsewhere will show. At the same time the rapidly increasing size of the freshman, sophomore and junior classes, makes it imperative that more instructors be employed for field work, drawing, laboratory work and shop work. The need of additional help is felt in every department.

I believe that our instructors should be encouraged to attend summer school in some of the larger institutions and also to enter some of the large manufacturing concerns, if possible, to get in closer touch with the best methods of doing the work required of them.

The several engineering societies should be encouraged and a larger number of students should participate in the work.

It would be very desirable to have a reading room where technical journals might be accessible to students nearer to their work than the general library. Owing to the fact that no room seems to be available for this purpose, I am unable to make definite recommendations at this time. Our general library should be greatly strengthened by the addition of standard authoratative works on various engineering and technical subjects. No one thing would be of greater value than to have the published proceedings of the leading engineering societies of the country regularly coming to our library. I would recommend that they be included in the list of periodicals provided for each year.

Respectfully submitted,

G. A. COVELL,

Dean.

REPORT OF THE DEAN OF THE SCHOOL OF COMMERCE.

To the President of the College,

Sir: The School of Commerce is one of the younger departments of the institution and its history is, therefore, brief. Courses in "Shop Accounts" have been offered as far back as 1890 in obedience to the requirements of the Morrill Act, but it was not until 1898 that the course known as the Literary Commerce course was organized. The attendance in this course for the last two years reported by Professor Crawford, was as follows: In 1906-7, Accounting, 53; Stenography and Typewriting, 33; in 1907-8, Accounting, 58; Stenography and Typewriting, 55.

With the expansion of the institution in every direction and in response to the growing demand for leaders in commercial enterprises, the Regents established the School of Commerce in the spring of 1908. As organized at present, the School embraces four distinct departments, viz.: Business Administration, including Accounting and Auditing; Political Economy, including Banking and Finance; Political Science, including Commercial Law; and Stenography and Typewriting. Seven different courses are offered in Business Administration, eleven in Political Economy, four in Political Science, and five in Stenography. Additional courses will be offered as teaching force and equipment permit.

The School of Commerce is taking a leading part among schools in emphasizing the business side of the farm, the shop, and the household. While the School of Commerce places special emphasis on work preparatory to commercial pursuits, the fact that there is a business side to every vocation has been recognized by providing in the second year of all elementary courses, a two-hour course in Business Methods, especially adapted for the farmer, mechanic, housekeeper, and the professional man.

In spite of serious difficulties, the work of the present year has been very encouraging thus far. The attendance is as follows: Elementary, 27; Freshmen, 29; Sophomores, 32; Juniors, 16; Seniors, 18; Pharmacy students, 34; Domestic Science students, 56; total, 212.

By subjects the attendance is as follows: Elementary Bookkeeping, 53; Advanced Accounting and Business Practice, 25; Banking and Business Management, 12; Economics, 41; Banking and Finance, 20; Commercial Law, 20; Civil Government, 25; Stenography, 40; Typewriting, 55; Pharmacy Accounting, 34; Household Business Management, 56; Business Organization (Post Graduate), 2; total 393.

The School of Commerce will have its temporary home on the third floor of the new Agronomy building. Six beautiful rooms have been set aside for its use. The west room devoted to Business Practice and Administration is already provided with up-to-date equipment for office practice. It has a seating capacity for 118 students. The rooms devoted to stenography and typewriting are also fairly well equipped, though it has been found necessary to rent typewriters for the present year. I recommend that twenty late model machines be purchased as soon as practicable.

Owing to the fact that the industrial business courses are not offered until next year and that the present teaching force is already inadequate, it will be necessary next year to add another assistant. There will be at least 200 second-year students in Agriculture, Engineering, and Mechanic Arts who will take up industrial accounting next year, and this will require the full time of an additional instructor.

An effort will be made to create an industrial museum in the department and a small appropriation will be required for this purpose. A great deal of valuable illustrative material can be secured from manufacturers and dealers free of cost, but transportation must usually be born by the institution.

In conclusion I desire to thank you for the support and encouragement the School of Commerce has enjoyed at your hands in common with other departments of the institution.

Respectfully submitted,

J. A. BEXELL,
Dean of the School of Commerce.

REPORT OF THE DEPARTMENT OF FORESTRY.

To the President of the College,

Sir: One of the chief sources of wealth in Oregon is the forests. The annual revenue from this source approximates $30,000,000, and it is conservatively estimated that the present cut is considerably below the annual increment of growth. Today our state is the richest state in the Union in standing timber, having at least one sixth of the total amount in the United States. Mr. Pinchot estimates that this crop will be cut in thirty-five years at the present rate of lumbering, though it may be said to our credit that the present output from Oregon is much below the average annual cut for the Nation. In view of this condition it would appear that the standing timber of the state in a few years will be valued in terms of billions of dollars, for we are assured by the history of all older nations that the price of timber steadily rises after the available supply begins to be measured in terms of years. What a marvellous source of wealth! What a fertile field for labor! How significant the wage income implied by such a gigantic resource! It bespeaks happy industrious homes, a rich commerce, a prosperous, contented, developed people—a great state! What is more important than that we wisely husband such a resource?

Official government reports indicate that the waste resulting from the harvesting of the enormous tree crop of this region varies from 25 per cent to 40 per cent, three-fifths of which could be saved if improved methods of utilization were employed, thereby contributing another $5,000,000 at least to our yearly income. Another source of waste is the increasingly large areas of diseased timber, the percentage of loss from this source often reaching 15 per cent to 20 per cent of the crop, or another $5,000,000. The loss from fire, though not heavy in recent years, has been altogether almost beyond estimate. A very conservative estimate would probably put the annual loss, including injury to the soil and young growth, at $100,000 to $250,000. Oregon timbermen assert that for every thousand feet of lumber put upon the market our people receive direct as wages about eight dollars. Every thousand feet of lumber destroyed by fire therefore is a direct loss to the public.

Does it not appear from these considerations that it behooves the State to take measures to protect, develop, and make permanent this great source of wealth? The Nation appropriates nearly $200,000 yearly for this purpose, *i. e.* for the administration of the National Forests within the state, the income from which will practically accrue to the citizens of Oregon at harvest time. If the subject is worthy of such care on the part of the Nation it certainly must be of more than passing importance to the State itself.

That the State has some imperative duties with reference to this subject seems apparent. There is a great industry, with an annual income of $30,000,000 or more, to foster;

an enormous annual loss from waste, disease, fire and pests, of $10,000,000 or over, to prevent; a strong public sentiment looking to forest conservation, fire protection, sane taxation and reforestation, to be developed; and a sound economic State forest policy is also necessary. To accomplish these ends implies much work of a special, scientific and technical character. It will require the services of men especially trained to conduct the investigations, to promote the publicity, and to extend the education necessary to bring about the accomplishment of such comprehensive results.

To meet such a demand this College has provided a regular degree course of four years, which is to be supplemented with winter and summer short courses. While the leading course aims to provide students with a technical training, it does not lose sight of the fact that a College graduate and a forester should have a well-rounded education equipping him for efficient citizenship as well as for a special occupation. To this end the course of study covers a field of work somewhat more liberal than a purely technical course. At the same time the short courses, and particularly the summer course, which is altogether field practice in general forestry, rounds out the student's training in the technical branches of the subject. Besides offering the student opportunities to secure a liberal and technical education in the general subject of forestry, it also affords him, through its various departmental laboratories a wide range of privileges in the pursuit of special information upon particular topics, such as construction work, timber technology, forest engineering, forest regeneration, tree-growth and tree-culture, the chemistry of forest products, utilization of forest waste, animal husbandry, forest protection, tree and timber diseases and pests, timber preservation, destructive distillation, and such other technical topics as appeal to the tastes of the individual student, the purpose being to educate and train a force of men competent to develop the forest interests of the state in their every phase, whether of public or private ownership. The graduate from such a course is competent to enter upon the great work of helping to solve the problems of forest protection, conservation, utilization, and development, which, at no distant day, will be demanded by the people of the state.

To meet the requirements for the special technical instruction demanded for such training it is imperative that provision be made for floor space aggregating some four thousand square feet; apparatus and equipment, costing approximately $3,600; $2,400 for assistance for the biennium; and land for a forest nursery which will cost $4,000. This last item is one of particular importance. A tract of timbered land suitable for demonstration work in surveying, mensuration, cruising, logging, reforestation, nursery-work, and the great variety of out-door practicums attendant upon such a course of study is a prerequisite. A forest course given without access to a forest and nursery would be like a course in chemistry without access to a laboratory, for the forest is, in fact, the chief laboratory of the forest course.

In order to place this department upon an efficient working basis at a minimum cost a plan of co-operation with the department of Mechanical Engineering has been arranged whereby several pieces of expensive apparatus will be used in common. This plan will result in a considerable reduction in the cost of the original installment of a suitable equipment for this department, and though involving the students in extra labor it is thought that under the circumstances the joint use of some $5,000 worth of apparatus is practical economy at this time.

Permit me in closing this brief report to call your attention to a measure now before Congress which has for its purpose the endowment of schools and colleges teaching and conducting research work in forestry. As an indication of the attitude of the public towards this line of education and research, it may be said that every state in the Union has endorsed the measure officially or otherwise. This measure expressly provides $5,000 annually for teaching the subject, and an equal amount for research on condition that each state accepting the grant provides an equal amount for the same purpose.

Respectfully submitted,

E. R. LAKE,
Professor of Forestry.

REPORT OF THE DEPARTMENT OF PHARMACY.

To the President of the College,

Sir: With the enactment of the law to regulate the manufacture and sale of medicine within the state, professional pharmacy of Oregon was placed upon a higher plane. By provision of this law a Board of Pharmacy was authorized whose duty it is to pass upon the qualifications of all persons desiring to practice pharmacy in this state. Eligibility of candidates is determined by means of rigid examinations held by this Board.

At the time of the enactment of this law, no course of instruction was offered in pharmacy by any institution in the state. It soon became apparent, however, that, with the elevation of professional standards, came the necessity of meeting in an educational way the new condition of affairs.

Appreciating the needs of the situation and realizing that such instruction could very economically be given at this institution, the Regents of the College, after advising with and receiving the approval of the U. S. Commissioner of Education, decided to include such a course in the curriculum of the College. The success of the department during the ten years of its activity attests the wisdom of that decision. It is no longer necessary for the young men and women of Oregon to leave the state in order to receive pharmaceutical instruction. Graduates of this department occupy prominent positions of trust and responsibility, not only in Oregon and adjoining states, but also in the East and in our Insular possessions.

The character of the work done by the department, from a practical viewpoint, is evidenced by the approval and support of the State Board of Pharmacy.

With respect to the assumption that the course can be maintained with exceptional economy at this institution, explanation may be offered that, since laboratories and instructional force are maintained in the subjects of chemistry, in physics, in botany, in biology, and in bacteriology for use of students in the courses of agriculture, engineering, and domestic science, and since these subjects form the scientific base upon which the profession of pharmacy rests, it follows that students in this department, by association with those of other departments, may receive instruction in these subjects at a very slight additional expense to the College.

The character of the instruction given by the department is such as to fit its graduates not only for the most exacting service in pharmacy, but also to qualify them for positions as chemists and as instructors in various scientific subjects. It not infrequently happens that graduates in pharmacy enter medical colleges, the training as pharmacists enabling them to take up the study of medicine under the most favorable conditions.

A resume and comparison of the work of the department during the past two years and an observation and estimate of the same for the current year, may be of interest. With respect to the number of students enrolled in the department during the time mentioned, the following tabulation will afford information and opportunity for comparison:

	1906-7.	*1907-8.*	*1908-9.*
Total students enrolled	78	80	91
Reporting for advanced, or professional features of the work	45	56	66

For the years 1906-7 and 1907-8 the three terms system of instruction obtained. Under conditions then existing, the work was arranged in such manner that it was handled by one instructor. The average amount of instruction per week was 24 credits, and the size of the sections, or classes, was for the first year sixteen and for the second, nineteen. For the current year, under the semester system, the work for the first semester is so adjusted that one instructor is doing practically all the teaching. The credits per week are, on average, twenty; and the students per section, twenty-seven. The character of the work as outlined for the second semester is such as to require an increase in the number of sections and a corresponding decrease in the number of students per section. The instructor will then require the services of an assistant to a greater extent than has before been found necessary.

It is estimated that the work during the biennial term, July 1, 1909, to June 30, 1911, will average with respect to the pharmaceutical subjects, thirty-two classes or sections to be instructed per week. As a considerable portion of this work will consist of laboratory practice, the average number of periods actually involved will exceed forty. The number of students per section should not greatly exceed fifteen, if it is expected that the student receive proper exhibition of the subject taught. The services of two instructors would insure the work being given in this manner.

The present quarters of the department, Alpha Hall, assuming exclusive use of entire building, will suffice for present needs. Certain repairs and alterations are needed to place the building in fit condition for its use to house the department. The attempt to heat the building by means of stoves has proven the inadequacy of such a system. It may be timely to call attention to the fact that the use of stoves in the various rooms, lacking as we do all means of fighting fire, places the building in jeopardy of loss by that element. The need of a steam heating system for the building is so urgent as to call for the statement that without it the building, in winter weather, cannot be used.

Respectfully submitted,

C. M. McKellips,
Professor of Pharmacy.

REPORT OF THE LIBRARIAN.

To the President of the College,

Sir: Based upon the outline sent from your office on October 12, 1908, the following report of the present condition of the Oregon Agricultural College library and its needs for the next biennium is respectfully submitted:

Books in Library.

General and reference books (bound volumes)	7,180
Government documents	5,000
Pamphlets (estimated)	10,000

Library Rooms.

The general reading room is 60 feet by 40 feet and has a seating capacity at the tables of 108 readers. Reference books and current periodicals are kept in this room for the service of all students. The general stack room contains the general, or classed, books of the library and the bound periodicals, and is equipped with two tables and twelve chairs. Here special reference work is done by the faculty, graduate students, and seniors.

In the document stack room are kept the government documents and the unbound periodicals which the library keeps on file.

There is also an office for the librarian, and a small store room.

Organization of the Library.

On the second day of July, 1908, the present librarian began the work of organizing the library. A trained cataloger, Miss Edna Hawley, cataloger for the Oregon State Library, was secured for three months, and a student assistant was also employed for the greater part of this time. The library, including books kept in the departments for reference use, was classified and cataloged. A dictionary card catalog and a classified shelf list were made. The Dewey decimal classification system, which is in general use in the libraries of the United States, was used. The books were marked and arranged on the shelves by classes, so that they are now easily accessible.

The Oregon Agricultural College library is a government depository library and receives all the government documents which are sent to libraries. During the summer these were arranged by congress and session. The serial numbers given by the government were assigned in their proper order; and, through the kindness of the Engineering department, were marked on the back of each volume so that now the material contained in the government documents may be easily found by use of the government document indexes.

During the time that this work of organizing the library was going forward the library was moved from its old quarters in the basement of the Administration building to the second floor in the rooms described above.

REQUIREMENTS FOR THE NEXT BIENNIUM.

Room.

The reading and general stack rooms can probably be made to do for the next two years, though the reading room is altogether too small for a school of this size. An additional stack room will have to be provided for government documents and the periodicals which are kept on file.

Equipment.

Six stacks at $40 each	$ 240.00
10,000 Blank catalog cards	29.50
10,000 Library of Congress printed catalog cards	100.00
Library of Congress printed cards for government sets and technical and scientific society transactions	100.00
Periodical record guide cards	5.00
Catalog case (60 tray)	130.00
Shelving for reading room to meet growth of reference collection	100.00
Periodical racks	75.00
Small cases and desk trays	4.00
100 Pamphlet cases	11.00
200 Book supports	15.00

100 Shelf label holders	7.50
Periodical temporary binders	75.00
100 Pamphlet covers	11.00
Postal scales (National)	5.40
Miscellaneous	100.00
	$1,008.40

Supplies.

Postage	$ 100.00
Miscellaneous supplies (including inks, book varnish, pencils, erasers, clips, typewriter ribbons, etc.)	100.00
Printing	50.00
Book repair material	20.00
	$ 270.00

Books. (Exclusive of department estimates included in department reports.)

Reference books: The reference books most needed are the New International encyclopedia, a one volume unabridged dictionary, the Scranton International Correspondence School text-books on technical subjects, technical dictionaries and encyclopedias, and indexes to technical literature. The reference collection for English work is very limited and needs large additions	$1,000.00
Current periodicals	800.00
Binding of periodicals and bulletins	1,000.00
General collection for reading room: This collection should be a very carefully selected collection for general culture, kept in the reading room where students in the technical courses will be tempted to use it. The best of our technical schools are becoming aware that we are sending out men who know machines, but who do not know men,—life. The student of the technical school takes these extended courses not alone that he may become a skilled mechanic—he learns machines that he may know how to manage the men who run machines. I believe that our school will be successful in sending out really great engineers and agriculturists in the degree that this is realized. For such a collection we will require	$ 500.00

Back numbers of valuable sets of technical journals, periodicals, and society transactions	500.00
General binding	100.00
Sociology, government, etc.	200.00
History and biography	400.00
Useful Arts	200.00
Science	200.00
Travel and geography	200.00
Art	100.00
	$5,200.00

In all the above items of equipment, supplies, and books, each group has been arranged according to desirability, though every item seems to me a necessity if the library is to catch up with the rest of the school, not to mention keeping pace with it. However, if there must be a reduction of the estimate, I would recommend cutting out entirely the least necessary items and doing well what we attempt to do. From what I have seen, I judge that at least $4,000 will be estimated to meet the needs of the departments for the coming two years. Such an estimate I should consider conservative. If it should be necessary to lower the estimate I think it should not be for either reference books, binding of periodicals and bulletins, or current periodicals. We must have better reference tools.

Assistance.

At present the assistance in the library is a student working three recitation hours a day during the school week and all day on Saturday. This help is entirely inadequate to meet the needs of the library. A full time assistant is recommended, one who has had either regular library school training or summer school training. She should be able to do the technical work of the library. Such an assistant could probably be secured for $75 per month	$1,800.00
Student help as at present	300.00
	$2,100.00

Library Expansion Suggested.

As soon as a full time assistant may be had, the library should be open evenings for the sake of both the students and faculty. There should be given regular class instruction to freshmen once a week in the use of the library,—how to use catalogs, indexes, and general reference books, with practical problems fixing instruction given. There should also be given by the librarian during the year, a series of eight or ten talks on reading to inspire an interest in good books and to cultivate the habit of good reading. These talks should be obligatory for freshmen and elective for students above the freshman year. This course is especially necessary in a technical school, where, of necessity, general culture gets too scant attention. To overcome this disadvantage of a technical school, University of Illinois has required of her engineers for the past two years a regular summer (vacation) course in general reading for culture. This is also in line with the Princeton preceptorial method which is creating so much interest in the educational world.

There is a great deal of work which should be done for our library in securing reports, bulletins and circulars, especially for the agricultural department. Our files of government and state reports and bulletins have not been carefully preserved and it is imperative that as soon as possible these files should be filled where it may still be done. To this end, as soon as sufficient help can be supplied, the experiment station exchange mailing list should be turned over to the library, for it is through careful attention here that the library file of bulletins, reports and other valuable publications are kept filled to date. The United States Department of Agriculture publishes card catalogs of its publications which have been sent to this library. These cards have not all been preserved. One catalog has never been filed for use, and the other has not been filed since 1901.

The Oregon Agricultural College in its extension work should not neglect home reading and culture among the farmers of Oregon. This work naturally falls to the library; and, with a good assistant, would be practicable. The work should be planned in conjunction with the Oregon Library Commission which is doing work along this line, so that there would be no duplication of effort. It would probably require occasional talks at farmers' institutes on home reading and home libraries; also preparation of selected book lists and bulletins. Short, helpful talks on reading in the home should be given during our short courses.

Your request for recommendations leads me to present the above.

Respectfully submitted,

IDA A. KIDDER,

Librarian.

REPORT OF THE REGISTRAR.

To the President of the College,

Sir: In compliance with your request of October 12th, I submit herewith statements of the enrollment, the classification by years and courses of study, and the geographical distribution of students for the years 1906-1907 and 1907-1908.

STUDENTS CLASSIFIED BY COURSES OF STUDY, 1906-1907.

Mechanics:		
Seniors	2	
Juniors	6	
Sophomores	41	
Freshmen	76	
Electrical Engineering:		
Seniors	19	
Juniors	15—	159

Household Science:		
Seniors	9	
Juniors	7	
Sophomores	13	
Freshmen	52—	81
Agriculture:		
Seniors	13	
Juniors	2	
Sophomores	18	
Freshmen	47—	80
Pharmacy:		
Seniors	10	
Juniors	4	
Sophomores	16	
Freshmen	48—	78
Special in Chemistry:		
Seniors	1—	1
Literary Commerce:		
Seniors	8	
Juniors	5	
Sophomores	21	
Freshmen	63—	97
Mining:		
Seniors	4	
Juniors	7	
Sophomores	10	
Freshmen	20—	41
Civil Engineering:		
Sophomores	15	
Freshmen	18—	33
Forestry:		
Sophomores	2	
Freshmen	3—	5
Graduates		14
Special Students		24
Sub-Freshmen		132
Dairying and Agriculture		56
Music		147
Grand total		948

Counted Twice:		
Music		115
Number of Students		833
Whole number of men	615	
Whole number of women	218	
	833	

STUDENTS CLASSIFIED BY YEARS, 1906-1907.

Graduates		14
Seniors:		
Agriculture	13	
Household Science	9	
Electrical Engineering	19	
Mechanical Engineering	2	
Mining Engineering	4	
Pharmacy	10	
Literary Commerce	8	
Special in Chemistry	1—	66
Juniors:		
Agriculture	2	
Household Science	7	
Electrical Engineering	15	
Mechanical Engineering	6	
Mining Engineering	7	
Pharmacy	4	
Literary Commerce	5—	46
Sophomores:		
Agriculture	18	
Forestry	2	
Household Science	13	
Civil Engineering	15	
Mechanical Engineering	41	
Mining Engineering	10	
Pharmacy	16	
Literary Commerce	21—	136
Freshmen:		
Agriculture	47	
Forestry	3	
Civil Engineering	18	

Mechanical Engineering	76	
Mining Engineering	20	
Pharmacy	48	
Literary Commerce	63	
Household Science	52—	327
Sub-Freshmen		132
Special		24
Special Agriculture and Dairying		56
Music		32
Total		833

STUDENTS CLASSIFIED BY COURSES OF STUDY, 1907-1908.

Agriculture:		
Graduates	3	
Seniors	8	
Juniors	8	
Sophomores	24	
Freshmen	60	
Dairying—Winter Course	28	
Summer Course in Agriculture	63	
General Agriculture—Winter Course	30	
Horticulture—Winter Course	12	
Special	6—	242
Forestry:		
Sophomores	5	
Freshmen	5—	10
Household Science:		
Graduates	2	
Seniors	12	
Juniors	9	
Sophomores	27	
Freshmen	60	
Household Science—Winter Course	29	
Special	16—	155
Civil Engineering:		
Graduates	1	
Seniors	4	
Juniors	5	
Sophomores	19	
Freshmen	47—	76

Electrical Engineering:		
Graduates	1	
Seniors	16	
Juniors	27	
Sophomores	30	
Freshmen	63—	137
Mechanical Engineering:		
Graduates	1	
Seniors	9	
Juniors	4	
Sophomores	17	
Freshmen	57	
Mechanical Engineering—Winter Course	11—	99
Mining Engineering:		
Graduates	2	
Seniors	6	
Juniors	3	
Sophomores	20	
Freshmen	18	
Special	1—	50
Literary Commerce:		
Seniors	14	
Juniors	11	
Sophomores	21	
Freshmen	54	
Special	5—	105
Pharmacy:		
Graduates	1	
Seniors	11	
Juniors	4	
Sophomores	14	
Freshmen	49	
Special	1—	80
Sub-Freshmen		141
Graduates, Special		4
Specials		38
Music		20
Total		1157
Counted twice		1
Total number of students		1156

Total number of men	820
Total number of women	336
Total	1156

STUDENTS CLASSIFIED BY YEARS, 1907-1908.

Graduates		15
Seniors:		
Agriculture	8	
Household Science	12	
Civil Engineering	4	
Electrical Engineering	16	
Mechanical Engineering	9	
Mining Engineering	6	
Pharmacy	11	
Literary Commerce	14—	80
Juniors:		
Agriculture	8	
Household Science	9	
Civil Engineering	5	
Electrical Engineering	27	
Mechanical Engineering	4	
Mining Engineering	3	
Pharmacy	4	
Literary Commerce	11—	71
Sophomores:		
Agriculture	24	
Forestry	5	
Civil Engineering	19	
Household Science	27	
Electrical Engineering	30	
Mechanical Engineering	17	
Mining Engineering	20	
Pharmacy	14	
Literary Commerce	21—	177
Freshmen:		
Agriculture	60	
Forestry	5	
Civil Engineering	47	
Electrical Engineering	63	
Mechanical Engineering	57	

Mining Engineering	18	
Household Science	60	
Pharmacy	49	
Literary Commerce	54—	413
Sub-Freshmen		141
Specials		67
Music only		20
Winter Courses		110
Summer Course in Agriculture		63
Grand total		1157
Counted twice		1
Total		1156

STUDENTS CLASSIFIED BY COUNTIES, STATES AND FOREIGN COUNTRIES.

	1906-7.	*1907-8.*		*1906-7.*	*1907-8.*
Baker	20	20	Lincoln	7	11
Benton	115	198	Linn	59	79
Clackamas	39	47	Malheur	24	12
Clatsop	12	23	Marion	43	60
Columbia	16	14	Morrow	24	22
Coos	14	13	Multnomah	89	127
Crook	6	12	Polk	27	37
Curry	0	3	Sherman	9	7
Douglas	17	25	Tillamook	8	5
Gilliam	6	11	Union	27	35
Grant	3	9	Umatilla	23	26
Harney	7	13	Wasco	34	41
Jackson	6	11	Washington	35	56
Josephine	6	4	Wheeler	3	2
Klamath	9	15	Wallowa	8	17
Lake	1	7	Yamhill	30	52
Lane	20	28			

	1906-7.	*1907-8.*
Number of counties in Oregon	33	33
Total number of counties represented	32	33

Total number of students from—	*1906-7.*	*1907-8.*
Oregon	747	1042
Arkansas	2	1
Alaska	2	3

California	9	16
Colorado	1	2
Idaho	4	10
Indiana	0	2
Illinois	2	0
Iowa	19	15
Kansas	1	1
Michigan	2	1
Missouri	2	2
Montana	1	1
Nebraska	9	7
Nevada	0	1
New Hampshire	1	0
New Jersey	1	1
North Dakota	0	1
Oklahoma	1	0
Pennsylvania	1	0
South Dakota	0	3
Texas	0	2
Utah	0	4
Washington	30	35
Wyoming	0	1
British Columbia	1	1
India	6	4
Total	833	1156

Respectfully submitted,

J. B. Horner,
Registrar.

REPORT OF THE DIRECTOR OF THE EXPERIMENT STATION.

To the President of the College,

Sir: I have the honor to submit herewith the report of the Experiment Station for the year ending June 30, 1908, together with suggestions which are deemed of especial importance to the agricultural interests of the state.

The work of the various departments of the Experiment Station has made commendable progress during the past year. However, new problems and fresh difficulties are constantly confronting the Station workers. This is due largely to the transitory condition of our agriculture from extensive to more intensive systems of husbandry. Dairying, the largest single agricultural industry of the state, has in a measure during the past year been somewhat retarded in its development owing to the abnormal cost of concentrated feed. Thus this industry demands for its best interests that much work should be done in an attempt to evolve systems of crop growth that will enable the farmer to supply the requirements of his herd from his own farm. This work has received a goodly share of the attention of the Station in the way of producing special crops for the dairy. The Station has demonstrated beyond question that alfalfa can be successfully grown on practically all of the well-drained soil of Western Oregon. This of itself should add millions of dollars to the dairy interests of this section. It has also demonstrated that kale (*Brassica oleracea*) in an ordinary winter, is by far the most economical winter succulent feed that can be grown west of the Cascade range. Not only is this an excellent succulent feed for the dairy cow, but sheep and hogs can also be wintered cheaply on this feed.

Owing to the very high price of mill feed many substitutes have found their way into the channels of trade, and while this state has no control law regulating the sale of these substitutes feeds, the Station has at all times endeavored, so far as practicable, to safeguard the purchasers' interests by conducting experiments in feeding and analyzing these substitutes. In some cases they were found to be of little value and dairymen have been appraised of this fact. There is, however, a very large field of work presented by the dairy interests of this state.

Without doubt, fruit growing is the most rapidly developing branch of agriculture at the present time. Oregon is destined to become one of the greatest fruit-growing states in the Union. Thus it becomes the duty of the Experiment Station to assist in every way possible those who are engaged in this great industry. Despite the fact that conditions are exceptionally favorable for fruit growing throughout the state, there are, however, a number of very serious problems confronting growers. Among the most serious are Pear Blight, Anthracnose, Apple and Pear Scab and Gummosis of the Cherry. While the Station has done much work of investigation, the problems presented by these pests are far from being satisfactorily solved. There should be a special representative of the Station located at Hood River. We do not recommend this because Hood River is more seriously troubled than other sections, which is not so, but in the interest of economy, because the fruit-growing industry of this valley is more highly developed and more concentrated than in any other section. Thus a representative of the Station at this point can accomplish more than he can at any other fruit district in the state.

DEPARTMENT OF ENTOMOLOGY.

As in the two preceding years, the work may be conveniently grouped under A, Adams Investigations, B, work under Hatch Act.

A. *Adams Investigations.*

Under the Adams Act three problems are being investigated by this department:

1. Lime-Sulphur Spray.
2. Apple Tree Anthracnose.
3. Cherry Gummosis.

In the Lime-Sulphur investigation we have materially increased our knowledge of the stock solution method of preparing such sprays, a method which is now attracting considerable attention in various parts of the country. We have also verified the results of the two previous years' work as to the value of such sprays in controlling San Jose

Scale and have accumulated further experimental evidence which serves to extend the range of usefulness of this spray as an insecticide. The most important part of the work, however, has been to demonstrate the value of spring applications of dilute lime-sulphur solutions in controlling apple scab and other fungous diseases.

In that portion of the investigation which deals with the nature of the lime-sulphur compounds, and which attempts to learn how and why such compounds destroy insects and fungi and injure foliage, comparatively little progress has been made. In this connection it is evident that before satisfactory progress can be made it is necessary first to thoroughly investigate the chemistry of lime-sulphur compounds.

Apple Tree Anthracnose.—Material progress has also been made in the Apple Tree Anthracnose investigation. The orchard survey which was undertaken to study the effect of soil conditions in their relation to this disease and also to note the relative susceptibility of different varieties of apple trees in its attacks, has been completed. The co-operative experiments in the orchard of Hart Brothers at Springfield were continued with satisfactory results, demonstrating in connection with the work of the preceding year that it is practicable to nearly exterminate the disease from badly infested orchards in two years by the fall spraying methods which have been previously recommended by this department. We have also determined by cultures and cross-inoculations that under such adverse climatic conditions as prevailed last spring the Anthracnose fungus may also attack pear, prune, peach and apricot trees.

Cherry Gummosis.—Considerable literature relating to the same or similar diseases in other countries has been consulted, a rather extensive bibliography of the subject has been prepared, and some field observations were made during the past summer.

B. Under Hatch Act.

The principal work done under the Hatch Act has been co-operative spraying experiments in controlling Peach Fruit Spot in the orchard of Mr. Joy at Ashland. This is a continuation of the work of last year and has given even better results. The two seasons' work has demonstrated that this most serious of the peach diseases of the state can be very readily controlled by spraying. Arrangements have been made to continue the work another season to determine the minimum number of applications that will prove effective.

Some observations were made upon the work of the Shothole Borer, Xyleborus dispar, and also upon an undetermined pear and apple disease which was very prevalent last spring.

DEPARTMENT OF HORTICULTURE.

Adams Act.—Horticulture 1.

Pollenation of the Apple and Condition Affecting It.—Considerable progress has been made in the pollenation work, on such phases as the blooming period, determination of sterile and fertile varieties, transportation of pollen, mutual affinities and receptive periods of blossoms.

Horticulture 2.—

Irrigation of Fruit in the Rogue River Valley.—Under irrigation, careful notes have been taken on the progress of irrigation in the action of one application or a combination of applications at various dates. It is yet too early to draw definite conclusions as to this year's work.

Horticulture and Entomology, Project I.

Gummosis of the Cherry.—On the gummosis work some observations have been made on soils and exposures and seven hundred young cherry trees are being set out this fall for experiments in grafting in its relation to this condition.

Hatch Act.—Co-operative Work.

A. With Fruit Growers.

Two orchards in the Willamette Valley to determine the best varieties, and feasibility of commercial orcharding in this valley, especially with young trees.

Cover crop work in various parts of the state.

B. With National Department of Agriculture.

Disease resistance of potatoes.

Determination of blooming periods and growth of fruit trees.

Experiments with citrange.

DEPARTMENT OF CHEMISTRY.

Adams Act.—Chemistry 1.

Soil Leaching Experiments.—This investigation was planned with the following ends in view:

First: To determine the composition of the natural drainage waters from the various types of Oregon soils, tested with and without crops.

Second: To study the immediate effect of fertilizer application upon these soils as shown in drainage waters, special attention being paid to the results of potash and lime applications.

Third: To determine the total mineral plant food, potassium, calcium and phosphorus in various soil types, with special attention to lime existing in the carbonate form. No such determinations have thus far been made on our soils.

Fourth: To determine the actual loss of plant food from the Willamette and Columbia river basins as obtained by monthly analyses of these river waters throughout the year. The results obtained in 3 and 4 above will give us valuable data for estimating the permanency of our soils.

Fifth: To determine the depth of penetrations of various fertilizers with definite amounts of rainfall, special attention being paid to the fixation of lime and potash in subsoils.

Sixth: To obtain a more exact theoretical knowledge of fertilizer action on the soil by detailed study of the properties and reactions of the various components of the soil, considered both singly and in mixtures.

Results of Investigations.—Previous work in this laboratory has shown that Western Oregon soils are almost universally rich in phosphates but only moderately well supplied with lime and potash; our work this year on the natural drainage from the College farm soil as a type has shown that phosphorus is lost in very small quantities, that potash is leached from the soil in quantities approximately four times that of the phosphates and that lime appears in these drainage waters in quantities from two to three times that of the potash. A study of various subsoils to the four-foot level has developed the interesting fact that much of this surface-leached lime has been fixed in the subsoil, the percentage of lime at the three-foot level often being double that of the surface nine inches. The fact that a deep rooting crop may have access to this lime is of great practical interest.

Chemistry 2.

Study of Digestibility of Steamed Corn and Vetch Silage. —This work has been completed and the results tabulated in bulletin form, which is now in press.

Chemistry 3.

Study of Lupulin and Other Active Principles of Hops.—Experiments with forced draft though promising have not yet developed an inexpensive and efficient method of drying. Low temperature drying has been demonstrated necessary for obtaining a high grade product. At a temperature of 120° lupulin has been found to soften, undergoing physical if not chemical changes with detriment to its quality. A sample of hops dried at a maximum temperature of 120° Farenheit, under the supervision of this department, was graded choice by an expert buyer. Chemical determinations of resin and oil content of various samples show that our choice hops do not vary much from the same grade of Bavarian hops in this respect, the quality of the aroma, however, being of a different character. Experiments with some Bavarian varieties as noted in the yard of a prominent grower indicate that the Bavarian hop does not thrive well here.

Valuable work could be done in breeding varieties of good yield and with more delicate aroma than those now grown.

Hatch Act.—Co-operative with Department of Poultry Husbandry.

1. Chemical Studies in Incubation.

In co-operation with the Department of Poultry Husbandry a large series of determinations of carbon dioxide and moisture were made on both incubator air and the air beneath sitting hens.

Conclusion—

First: Carbon dioxide increases in both incubator and under hens as the incubation period progresses, being higher in each case just before hatching.

Second: Amount under hens averages somewhat higher than that in incubators.

Third: In view of the fact that great variation is noted with different hens under the same conditions and that applications of carbon dioxide in incubators does not improve hatching, it is concluded that carbon dioxide is not an important factor in determining the efficiency of incubation.

2. Composition of Milk from College Herd.

In co-operation with the Dairy Department during the past year the composition of samples of milk from the College herd was determined, testing both hand and machine milk. These determinations were made weekly throughout the year and give the first available data on the seasonal variation of milk in this state. This work is completed and results ready for publication.

3. Vetch Selection.

4. Composition of Spraying Material.

5. Sugar Beet Work, in co-operation with the Government Reclamation Service, Klamath County.

6. Peppermint Work.

During the year a shipment of peppermint roots has been received from the Michigan Station sent at the request of this Station for testing on our beaverdam soils. Through the co-operation of Mr. S. C. Inkley, a farmer of Washington County, they have been planted and will be tested for oil in due time.

7. Potash Determinations.

Co-operative work with the Association of Official Agricultural Chemists has been done on investigations of new methods for determining potash. Some valuable data have been obtained for publication.

DEPARTMENT OF DAIRY HUSBANDRY.

Work in Progress.

(*a*) Milking machine investigations.

(*b*) Problems relating to the variation in the fat content of hand separator cream. Results to be published at an early date.

(*c*) Testing dairy herds for individual farmers which is designed to give the Station information relative to fat production of individual cows in farmer's herds and the cost of same.

Work Contemplated.

(*a*) A study of intensive dairying with the Station herd.

(*b*) An investigation of the percentage of solids not fat in milk, both actual and with relation to the fat content.

(*c*) A study of the possibilities in the manufacture and sale of soft cheese, Camembert, etc., in the state, particularly where transportation is a serious problem.

DEPARTMENT OF POULTRY HUSBANDRY.

Adams Act.—Poultry I.

Incubation Problems.

This work has been well organized and good results are expected during the current year.

Hatch Act.

1. (*a*) A study of the relative efficiency of natural and artificial incubation.

(*b*) Improvement in incubation and brooding.

2. An investigation of hen-hatched and artificially hatched chickens. The results of this investigation have been published in bulletin 100 of this Station.

In addition to the incubation work an elaborate experiment in poultry breeding has been undertaken.

DEPARTMENT OF BACTERIOLOGY.

The major work during the past year has been an investigation of the cause of mortality in incubator chicks that has consumed the largest portion of time. The progress has been satisfactory and a bulletin is now ready for the press setting forth the results in detail.

Work Contemplated.

(*a*) Testing the transmission of the tubercle bacilli from human sputa to fowls and of the bovine type to fowls by feeding.

(*b*) To test the transmission of bovine tubercle bacilli to milk through the mammary glands of the cow by feeding experiments, with cultures of the organisms.

DEPARTMENT OF AGRONOMY.

Experimental Work Now in Progress.

A. 1. Experiments with long and short rotation systems for improvement of soil fertility.

2. Experimental testing of the adaptability and value of alfalfa for hay and pasture in Western Oregon.

At the beginning of this experiment some eight years since it was generally thought by the farmers in the western section of the state that alfalfa could not be successfully grown. The experiments conducted at this Station have completely disproven this supposition, for not only has the Station grown alfalfa successfully but there are at least one hundred farmers growing alfalfa successfully in the Willamette Valley at this time.

3. Testing the adaptability and value of kale as a winter succulent feed for dairy cattle, swine and sheep.

4. Co-operative experiment in testing a number of varieties of vetch with the Bureau of Plant Industry, U. S. Department of Agriculture.

5. Experiment in co-operation with the Chemical Department in breeding Vicia sativa for higher protein content.

6. Experiment in clover growing for improving the fertility of so-called "white-land."

7. Experiment in breeding wheats for increase in both quantity and quality of yield.

8. Testing the relative value of dry plowing with disc plow and moist plowing with moldboard plow. (Results this past season were slightly in favor of moist plowing.)

9. Experiment in breeding corn to suit the environment of Western Oregon.

10. Experiment in co-operation with the Division of Farm Management, U. S. Department of Agriculture, in testing the value of cultivation compared with no cultivation without weeds.

11. Experiment in testing the value of irrigation (in the Willamette Valley) of vetch, clover, alfalfa, corn and potatoes in co-operation with the U. S. Department of Agriculture, Office of Experiment Stations.

DEPARTMENT OF ANIMAL HUSBANDRY.

The major work of this department for the past year consisted of soiling dairy cows; experimental feeding of kale to cows, sheep and swine to determine its value as a winter succulent feed and the fattening of swine.

Digestion experiments were also conducted in co-operation with the Department of Chemistry with steamed corn and vetch silage and with kale, results of which have been tabulated for a bulletin which is now in press.

Two experiments to determine the value of kale as a winter feed for swine resulted as follows:

Lot 1 consisted of three aged hogs—weight at beginning 1265 lbs.; weight at conclusion, after 46 days of feeding, 1310 lbs.; gain, 35 lbs. Consumed, kale 1580 lbs., chopped wheat 135 lbs.

Lot 2, comprising 6 shotes, weighing 558 lbs., consumed in 46 days, kale 2125 lbs., chopped wheat 281 lbs., gained 102 lbs., thus making a gain of one pound live weight for each 20.83 lbs. kale and 2.75 lbs. chopped wheat consumed.

The second experiment consisted of 2 lots of 6 shotes each,—period of feeding 45 days. Lot 1 weighed at beginning 660 lbs., at conclusion 810 lbs., gained 150 lbs.; consumed 3600 lbs. kale, 270 lbs. chopped wheat, requiring for each one pound gained 24 lbs. kale and 1.8 lbs. chopped wheat.

Lot 2. Initial weight 376 lbs.—at conclusion, 565 lbs Gained 189 lbs.—consumed 2135 lbs. kale, 1350 lbs. skim milk, 400 lbs. whey, consuming for each one pound gain 11.30 lbs. kale, 7.1 lbs. skim milk and 2.1 lbs. whey.

These experiments indicate that kale is a good maintenance feed for swine and that when it is fed with a small supplementary feed of grain or skim milk economical gains can be secured.

For the purpose of determining the relative value of chopped wheat and chopped barley as a fattening food for swine and also to determine the value of skim milk as a supplementary fattening food, 28 shotes were divided into 4 lots.

Lot 1 was fed chopped barley; lot 2 chopped barley and skim milk; lot 3 chopped wheat, lot 4 chopped wheat and skim milk. Period of fattening 61 days.

Lot 1, initial weight 872 lbs., consumed 2476 lbs. barley, gain 568 lbs., grain consumed for one pound gain, 4.36 lbs.

Lot 2, initial weight 880 lbs., consumed 2265 lbs. barley and 1619 lbs. skim milk; gained 669 lbs. Food required for one pound gain, barley 3.39 lbs., skim milk 2.47 lbs.

Lot 3, initial weight 899 lbs., consumed 2476 lbs. wheat, gained 506 lbs. Food required for one pound gain 4.89 lbs.

Lot 4, initial weight 869 lbs., consumed 2264 lbs. wheat and 1619 lbs. skim milk; gained 756 lbs. Food required for one pound gain, 2.99 lbs. wheat, 2.14 lbs. skim milk.

In this experiment the chopped barley gave slightly better results than the chopped wheat. The supplementary skim milk, however, gave rather remarkable results, especially with Lot 3. Taking as a comparison the amount of ground barley required to secure one pound gain in Lot 1, 149.50 lbs. of the gain in Lot 2 should be accredited to the skim milk. This extra gain estimated at $6.00 per cwt. would be worth $8.97, or giving skim milk in this instance a value of 55 cents per cwt. In Lot 4 the skim milk should receive credit for a gain of 293 pounds, which would give the skim milk a value of $1.08 per cwt.

There has been but little work done at this Station along the lines of fattening cattle and sheep. In order to satisfactorily meet the growing demand for information on these subjects it is suggested that the Station undertake feeding experiments with cattle and sheep on a sufficient scale to be of value both from the standpoint of experimental feeding as well as furnishing practical object lessons to the students in Animal Husbandry.

A feeding experiment with cattle, to be of real practical value, should be sufficiently large so that the individuality of any single animal will not materially affect the general result, hence I would suggest that an experiment with at least sixteen cattle be undertaken. These could be divided into four lots of different types, or they may be divided so that different feeding stuffs can be used. This will be a useful investigation to stock feeders and at the same time will give our students in Animal Husbandry a good opportunity of gaining valuable experience in the desirability of certain types of stock and also the advantage of the different methods of feeding. Furthermore the animals could be marketed to a much better advantage in car-load lots.

Practically nothing has been attempted thus far in this state in the line of experimental feeding of sheep. This should be made an important industry on the farms of Oregon. Hence the Station should at the earliest opportunity conduct some feeding experiments with sheep.

MORE LAND REQUIRED.

The acreage of the present College farm is inadequate for the proper solution of the many problems confronting two of our most important agricultural industries, viz., dairying and horticulture. These two industries if liberally supported should in less than two decades reach a production representing a combined value of one hundred million dollars annually. This development, however, in no small measure will depend upon the ability of this Station to successfully solve the many problems relating to those industries.

There is no question but that the work of this Station has been very helpful in the development of the various agricultural interests of the state, especially along the lines of improvement in general agricultural practices. The growing of clover, vetch, alfalfa, rape and kale throughout the western portion of the state, we modestly claim, is almost entirely due to the effort of this Station. This change from the system of grain growing and the bare fallow has been worth millions of dollars to our farmers.

While good progress has been made in the production of forage crops, equally good results could be reached in the matter of their economical utilization if the Station possessed the land and means to take up the work of dairy management. This would mean sufficient land and means to maintain a good practical dairy herd so that problems of feed production and the proper consumption of the same could be thoroughly investigated. It is evident that the dairy farmer can no longer depend upon mill feed. The output of this class of feed is entirely inadequate to the demand, thus the dairyman will be practically compelled to grow his own feed.

A dairy farm would enable the Station to take up work in soiling, crop rotation, the various problems of feeding cows, calves and swine. This work could be made of inestimable value to the dairy interests of Oregon.

Such a farm could also be utilized to demonstrate the correct principles of drainage and irrigation. There is scarcely a doubt but that a large portion of the Willamette Valley will ultimately be irrigated, thus the Station should secure all the data possible by means of a practical investigation. Drainage is also a very important problem. At least one-half of the Willamette Valley would be greatly benefited from drainage. These problems could be worked out in connection with the dairy farm. The farm also could be profitably utilized for plant breeding. There is an immense field presented for plant improvement. Varieties of corn could unquestionably be developed that would be of great value to the farmer. There is also an endless field for the improvement of the common cereals and the various forage plants.

In order to properly take up this work the College is in need of one hundred acres of additional land. This will cost approximately twenty thousand dollars. A convenient tract would be the land adjoining the College farm on the west, extending from the C. & E. Railroad on the south to the county road on the north. This land is not only conveniently located but it would also afford an excellent opportunity for experiments in irrigation. Oak Creek crosses the southwest corner of the land and there are at least fifty acres of the tract that could be irrigated.

Horticulture is another important industry and the land available for this work is entirely insufficient on the present College farm. The Experiment Station, under the Adams Act, operated under lease a local orchard for the past two years. This orchard consists of about four acres of Yellow Newtowns trees in bearing. The principal lines of work conducted were cultural methods, cover crops, cross pollenation, thinning of fruit and spraying investigations. Much valuable data has been obtained and it is very important that this work be continued.

ROUTINE WORK.

There is a constant and bewildering increase in the various departments of the Station. The correspondence of the Station is rapidly increasing. During the year 10,000 letters were written in answer to correspondents. This constantly increasing correspondence and the clerical work of the Station necessitates a great deal of stenographic work, thus additional assistance should be provided.

The departments of Chemistry, Entomology, and Bacteriology are simply overwhelmed with routine work at times. This work seriously interferes with the progress of scientific investigations of problems coming strictly within the province of the Station. This routine work is important to the industrial interest of the state and means should be provided by the state for the necessary assistance to properly care for this important feature of the work.

The Chemical Department of this Station has in the past endeavored to analyze free of charge the various materials received from the citizens of the state. This work has been mainly confined to those products representative of important industries of the state or knowledge of which would be of general interest to the public at large. Examinations of feeding stuffs, sprays, fertilizers, waters and natural deposits such as phosphates, lime, gypsum, clays and sand, have in this way been made. The development of the dairy, horticultural and other industries of the state has caused this routine work to assume large proportions and additional means must be furnished if it is handled properly. The chemical control of sprays, fertilizers, and feeding stuffs offered for sale within this state is a matter of no small import and has proven of extreme importance to other states. A fund appropriated by the state could be utilized to good advantage in furthering this work.

It is estimated that the proper control of the above work would require the services of a trained chemist throughout the year and an annual expenditure of two thousand dollars, divided as follows:

Salary of Chemist	$1,500
Chemical Supplies	500
	$2,000

EASTERN OREGON EXPERIMENT STATION.

This Station is making good progress and has accomplished much work that is of scientific and practical value to the farmers in that section of the state. The principle lines of endeavor have been the production of high-grade sugar beet seed, plant breeding, mainly by selection and confined principally to forage plants and cereals. Much valuable work in horticulture has also been done during the past year, including an orchard survey of the Grande Ronde Valley, spraying demonstrations and the testing of small fruits. In addition to the work conducted at the Experiment Station farm, considerable co-operative work has been done which should prove of great value. This consists mainly of an investigation in connection with fruit growers of the cherry worm and methods for controlling the codlin moth and the growing of various forage plants. Also valuable co-operative work has been carried on in connection with the National Department of Agriculture in testing dry-land alfalfa. For this purpose the use of land conveniently located to the Station has been secured. These dry-land experiments with forage plants are conducted at Hot Lake and Haymo Flat, the latter being at an elevation of 3,600 feet. Alfalfa representing practically all of the varieties known are under test at these places, also a large number of grasses are grown to test their value for range conditions.

In view of the fact that the eastern portion of our state is the great stock-producing region of Oregon, work along lines of experimental feeding of cattle, sheep and hogs should be undertaken. This section of the state presents a very large field for this class of work. Despite the fact of the immense numbers of live stock marketed from this section annually there is practically no data whatever as to the feasibility of finishing this stock in prime condition for the market.

DEMONSTRATION FARMS.

Among the many problems in agriculture the one of greatest magnitude and of the most immediate interest is found in the dry farming districts of the Columbia River Basin. In this section millions of bushels of wheat are produced, carrying away with it at least three million dollars worth of nitrogen annually. This tremendous drain upon the potentiality of the soil is continued from year to year without scarcely any attempt to restoration. The methods of husbandry followed in this section are not only exhausting the fertility of the soil, but the physical character of the soil is being changed in such a manner that will really jeopardize production sooner or later. There should be at least one or more demonstration farms established at the earliest opportunity in some typical section so that systems of husbandry if possible may be evolved to arrest this loss of fertility. These farms should be owned and controlled by the state. Not only may they be useful in solving problems of immediate interest but they will be needed for solving problems that will be constantly presented for an indefinite space of time. The value of such an experimental and demonstration farm to the agricultural interests of the dry farming sections of our state cannot be intelligently estimated. It would certainly prove to be a potent factor in developing new and better systems of farming which would greatly add to the agricultural wealth of our state.

DEMONSTRATION FARM AT HERMISTON IN CO-OPERATION WITH THE UNITED STATES RECLAMATION SERVICE.

Since large areas of arid land in this state are soon to be reclaimed by means of irrigation it is very important that experimental data be secured at the earliest practicable moment as to the duty of water, best method of application and character of fruit and other classes of vegetation best adapted to the location.

Hermiston presents a very favorable field for such investigation, being accessible and also representing a typical area of arid land.

It is proposed by the Secretary of the Interior that the general Government furnish the land, buildings, fences and bring the water to the farm, including the construction of the laterals without cost to the State, and also to provide for one-half of the expense of maintenance. Thus under such advantageous conditions much valuable data should be secured at very little cost to the state.

FARMERS' INSTITUTE AND OTHER EXTENSION WORK FROM SEPTEMBER 11, 1907, TO JUNE 20, 1908, INCLUSIVE.

Thirty-nine Farmers' Institutes were held. Number of sessions 93. Total attendance 11,300. In co-operation with the Oregon Railway & Navigation Company a demonstration train was operated from May 11 to 15th inclusive in Sherman, Gilliam, Morrow and Umatilla counties. Eighteen stops were made. Total attendance 6,000. In addition to this, members of the Station Staff have made practical demonstrations at several fairs and have addressed a number of special dairy and horticultural meetings.

The following station publications have been issued during the year:

	No. Issued.	Pages.
Bulletin No. 94 The Apple from Orchard to Market	10,000	48
Bulletin No. 95 Disease of Turkeys	10,000	8
Bulletin No. 96 The Poultry Industry	10,000	40
Bulletin No. 97 Comments upon the State Fertilizer Law	8,000	11
Bulletin No. 98 Preserving Wild Mushrooms	10,000	6
Circular Bulletin No. 2	5,000	24
	63,000	193

In addition to this a number of press bulletins have been sent out and considerable correspondence has been supplied to the agricultural and general press of the state.

ESTIMATED EXPENSES OF THE VARIOUS DEPARTMENTS OF THE STATION FOR THE YEAR ENDING JUNE 30, 1909.

Department of Entomology.

Adams Act.		
Salary of Assistant Chemist for Lime-Sulphur Investigations	$1200	
Salary Assistant, Anthracnose Investigations	1200	
Salary Assistant, Cherry Gummosis Investigations	900	
Salary Field Assistant	900	
Salary Head of Department	300	
Supplies, labor, traveling expenses	350	4850
Hatch Act.		
Salary Head of Department and Assistant	800	
Incidentals, labor and traveling expenses	500	1300
Total		$ 6150

Department of Chemistry.

Adams Act.		
Salaries of Chemist and Assistants	$ 2700	
Apparatus and supplies	500	
Books	50	3250

Hatch Act.

Equipment:		
Repairs	200	
Apparatus	1300	
Gas Machine	500	2000
Supplies:		
Chemicals	500	
Books	100	600
Salaries:		
Chemist and Assistants	700	
Routine (state)	1200	1900
		$ 4500
Adams		3250
Total		$ 7750

Department of Horticulture.

Adams Act.

Salaries		$ 2540
Assistance, supplies and incidentals:		
Assistance	$ 1280	
Supplies	175	
Incidentals and traveling expenses	425	1880
Total		$ 4420

Hatch Act.

Salaries	$ 2400	
Incidentals and supplies and labor	1400	3800
		$ 8220

Poultry Husbandry.

Adams Act.

Salary of Assistant	$ 700	
Poultry	200	
Feed	500	
Coal oil	100	1500

Hatch Act.

Salary Head of Department	1000	
Labor	1000	
Poultry, feed and incidentals	1000	3000
		$ 4500

Department of Agronomy.

Hatch Act.

Salaries	$ 1350	
Equipment and supplies	848	
Labor	3240	5438

Special Expenditures for College Improvements:

Farm Team (Percheron mares)	1500	
Seed storage room and manure yard cover	600	
Farm fencing	2000	
Farm drainage	4000	
Root cellar—cement floor	200	
Completion Interior New Barn	1500	
Painting and repairing Old Barn and Piggery	500	10300

Dairy Husbandry

Hatch Act.

Salary Head of Department	$ 1000	
Assistants	2600	
Additional dairy cattle	1500	
Equipment and supplies	100	5200

Department of Animal Husbandry.

Salaries	$ 2200	
Live stock, feed and incidentals	1000	3200

Printing, supplies and clerical assistance:

Salary of Printer	800	
Salary of stenographer and station clerk	840	
Salary of Assistant Stenographer	480	
Assistance in mailing bulletins	250	
Supplies, cuts, etc.	750	
Stamps and stationery	300	3420

Department of Bacteriology.

Hatch Act.

Salaries	$ 1700	
Supplies, equipment and assistance	850	2250

RECAPITULATION.

Eastern Oregon Experiment Stations and Demonstration Farms.

Eastern Oregon Experiment Station, maintenance for two years	$10540	
Dry farming demonstration farm, maintenance for two years	11500	
Demonstration farm at Hermiston, maintenance for two years	3070	25110
College farm improvements and live stock		11800
		$36910

Experiment Station.

Adams Act.

Department of Entomology	$ 4850	
Department of Chemistry	3250	
Department of Horticulture	4420	
Department of Poultry Husbandry	1500	14020

Hatch Act.

Department of Entomology	1300	
Department of Chemistry	4500	
Department of Horticulture	3800	
Department of Poultry Husbandry	3000	
Department of Agronomy	5438	
Department of Dairy Husbandry	3700	
Department of Bacteriology	2550	
Department of Animal Husbandry	3200	
Printing, supplies and clerical assistance	3420	30908
Total estimate under Adams and Hatch Acts		$44928

Income.

Adams Fund, 1909	$13000	
Hatch Fund	15000	
Sales, dairy, stock and fruit (estimated)	2000	30000
Deficit		$14928

For properly conducting the work of the Station and to meet the pressing demands from the various agricultural interests of the state, the following estimates are offered:

Assistant in Dairy Husbandry to co-operate with dairymen in an investigation of milk solids, testing and the manufacture of special classes of cheese, and expenses of operating dairy	$2000
Additional assistance in the Department of Chemistry	2000
Field assistant for plant breeding, department of Agronomy	1500
Field assistant for co-operative work in the Departments of Horticulture and Entomology	1500
	$7000

Thus the Station actually needs for the best interests of the agricultural industries of the state an appropriation of at least $7,000 annually.

In the event of the purchase of the 107 acres of land recommended and the establishment of the dairy there will probably be an increase revenue of two thousand dollars per year. However, the revenue of an Experiment Station should be regarded as an exceedingly minor matter. Much valuable work can be done by the Station in practical demonstration of dairying and horticulture which may not be revenue-producing and yet be of great value to the state at large.

Respectfully submitted,

JAMES WITHYCOMBE,

Director of the Experiment Station.

REPORT OF THE FARMERS' INSTITUTES.

To the President of the College,

Sir: I beg to report that the following Farmers' Institutes were conducted under the auspices of this College for the year 1907, from January first to December thirty-first inclusive:

Date.	*Place.*	*Date.*	*Place.*
Jan. 12	Roseburg	Sept. 11	Grants Pass
Jan. 30-31	Dufur	Sept. 16	Marshfield
Feb. 4	Tualatin	Oct. 4	Scio
Feb. 9	Harrisburg	Oct. 9	Vernonia
Feb. 11	Estacada	Oct. 10	Natal
Feb. 12	Damascus	Oct. 11	Fishhawk
Feb. 13	Logan	Oct. 12	Jewell
Feb. 14	Molalla	Oct. 17	Gresham
Feb. 15	Canby	Oct. 18-19	Scholls
Feb. 16	Oregon City	Nov. 5	New Era
Feb. 16	Beaverton	Nov. 6	Maple Lane
Feb. 20	Brooks	Nov. 7	Beaver Creek
Feb. 22	Junction City	Nov. 8	Needy
Feb. 23	Oak Grove	Nov. 9	Macksburg
Mar. 9	Irrigon	Nov. 12	Jefferson
Mar. 12	Turner	Nov. 13	Aumsville
Mar. 14	Sublimity	Nov. 14	Liberty
Mar. 15	Creswell	Nov. 15	Gervais
Mar. 30	Grants Pass	Nov. 16	Hubbard
May 18	Western Star Grange	Nov. 19	Crabtree
May 24-25	Stayton	Nov. 20	Lebanon
June 4	Sherwood	Nov. 21	Brownsville
June 5	Laurel	Nov. 22	Halsey
June 6	Forest Grove	Nov. 23	Harrisburg
June 7	Banks	Nov. 26	London
June 8	Hillsboro	Nov. 27	Cottage Grove
June 15	Vale	Nov. 29	Creswell
June 19	Grass Valley	Nov. 30	Junction City
June 20	Moro	Dec. 19	Scotts Mills
June 21	Wasco	Dec. 27-28	Monmouth

Total number of Institutes held, 1907	60
Total number of sessions	157
Counties represented	16
Aggregate attendance of all sessions	15,700

Services rendered by College Faculty, number of days, as follows:

Dr. W. J. Kerr	10 days
J. Withycombe	101 days

C. E. Bradley	59 days
C. I. Lewis	31 days
A. B. Cordley	12 days
James Dryden	6 days
Total	219 days

From January 1 to December 31, 1908, institutes were held as follows:

Date.	*Place.*	*No. Sessions.*	*Aggregate Attendance.*	
Feb. 1	Grants Pass	3	250	
Feb. 8	Wellsdale	3	150	
Mar. 7	Bellfountain	2	200	
Mar. 13	Toledo	1	100	
Mar. 21	Roseburg	2	250	
Mar. 28	Hermiston	1	75	
April 4	Medford	2	250	
June 6	Klamath Falls	2	300	
June 20	Butterville	2	75	
Sept. 2-3-4	Scio	3	1500	
Sept. 5	Oakland	1	175	
Sept. 11-12	Russellville	4	400	
Oct. 2	Medford	1	300	
Oct. 4	Canby	1	250	
Oct. 7	The Dalles	1	350	
Oct. 8-9	Mayville	2	300	
Oct. 13-14	Prineville	1	150	
Dec. 15	Baker City	2	250	
Dec. 16	Haines	2	175	
Dec. 17	Island City	3	150	
Dec. 18	Imbler	3	150	
Dec. 19	Cover	2	200	
Dec. 21-22	Hood River	3	270	
Dec. 28	Sublimity	3	450	
Dec. 30	Lebanon	3	350	7070

DEMONSTRATION TRAIN INSTITUTES.

Date.	*Place.*	*Attendance.*
May 11	Kent	250
	Grass Valley	260
	Moro	300
	Wasco	250

May 12	Condon	175	
	Clem	130	
	Lexington	335	
	Ione	450	
	Heppner	500	
May 13	Irrigon	250	
	Hermiston	250	
	Echo	450	
	Pilot Rock	250	
	Pendleton	225	
May 14	Milton	750	
	Weston	650	
	Athena	300	
	Adams	225	
Nov. 4	Hillsboro	250	
	Forest Grove	300	
	North Yamhill	500	
	Carlton	250	
Nov. 5	Newberg	2000	
	McMinnville	1000	
	Amity	450	
Nov. 6	Sheridan	300	
	Dallas	1500	
	Independence	1200	
	Wellsdale	75	
Nov. 7	Albany	250	
	Shedd	450	
	Harrisburg	1000	
	Junction City	500	
Nov. 9	Cottage Grove	650	
	Eugene	750	
	Springfield	650	
	Brownsville	1000	
Nov. 10	Jefferson	350	
	Salem	2250	
	Gervais	450	
	Woodburn	750	
Nov. 11	West Stayton	275	
	Silverton	1200	
	Hubbard	450	
	Aurora	450	25,250

Total number of Institutes, 1908	25
Number of Demonstration Train Institutes	45
Number of Sessions	98

Number of counties represented	23	
Aggregate attendance Farmers' Institutes		7,070
Aggregate attendance Demonstration Train Institutes		25,250
Total aggregate attendance		32,320

The institute work during the past two years has been very satisfactory, both in the matter of attendance and interest. There is no question as to the value of this work to the agricultural interests of the State. A wide range of subjects were presented, including mainly, however, The Home, Household Science, Education, General Agriculture, The Draft Horse, Dairying, Horticulture, Fruit Pests, Poultry, Farm Stock, Forage Plants, etc.

It is apparent from this report that much of the time of the Experiment Station Staff was given to institute work during the biennium. This unquestionably interferes with the work of investigation. However, it is important and highly necessary that the Station be represented at these institutes. The Station should be represented for two general reasons: first, it brings the farmer in close touch with the work of the Experiment Station; second, it enables the Station worker to ascertain more accurately the needs of the farmer.

There is a growing interest in the women's work at the institutes. I believe, however, it would be better if special institutes were held for women. At these institutes a representative of the Domestic Science and Art department of the College should be in attendance. Such institutes could be held during the pleasant season when the roads are in good condition; and, if held at places convenient for transportation, a large attendance will be secured and at the same time the institute workers could cover a large territory at minimum expense.

It would seem that in the interest of economy and efficiency it would be a good plan to place the general institute work in charge of some member of the Station Staff who is in touch with all of the departments of the Station and to whom class work is not assigned. Such a person could soon inform himself as to the needs of different localities and could arrange a programme accordingly. In districts where agriculture is highly specialized, such as dairying and horticulture, he could call to his aid for important institutes the specialists of the Station. With the aid of one or two well qualified stockmen, and with the local assistance that may be available, a successful series of institutes could be conducted without seriously trenching upon the time of the Station workers.

Through the courtesy of the Oregon Railroad and Navigation Company and the Southern Pacific Company, we have been enabled to introduce during the past year a new feature of extension work by means of demonstration trains. One of these trains was operated in the wheat growing section of the Columbia River Basin and the other in the Willamette Valley. Both of these trains were well received by the farmers and the attendance exceeded our expectations. These demonstration trains proved to be a very effectual and popular means for presenting to a large number of farmers much material of educational value.

In Eastern Oregon the work consisted mainly of lectures on dry-land farming, rotation systems with wheat growing and the keeping of domestic live stock on the wheat farms, both for profit and for the rejuvination of the soil.

The train operated in the Willamette Valley was strictly a demonstration train and perhaps the most elaborate and complete of anything of the kind seen on the continent. This consisted of a train of seven cars including a business car, day coach, sleeping car, and four cars of demonstration material, including a car equipped with modern dairy devices; a car furnished with a great array of agricultural exhibits; a horticultural car with charts and specimens of the principal fruit pests, model trees, and a large collection of material employed to demonstrate the correct methods of budding and grafting. At each stop a practical demonstration of apple packing was made; also a demonstration of the most approved methods of pruning. The fourth demonstration car was a miniature cow stable, equipped with two model stalls in which were stabled two high-classed cows. One of these cows was milked at each stop with a milking machine operated by a gasoline motor. The whole train was brim full of highly educational material and was an excellent example of a modern itinerant school on wheels.

It is contemplated by the Southern Pacific Company to co-operate with the Agricultural College in the operation of a similar train in Southern Oregon during the coming spring. This train will be especially designed for the purpose of demonstrating modern practice in horticulture and poultry husbandry.

Respectfully submitted,

JAMES WITHYCOMBE,
Director of Farmers' Institutes.

REPORT ON HEAT, LIGHT, AND POWER.

To the President of the College,

Sir: In accordance with your request I beg to submit the following report on the heating plant of the College:

HEATING.

Central Heating Plant.

In 1899 the present central heating plant was installed for the purpose of heating the Mechanical Hall, Administration building, Armory, Greenhouse and Horticultural building and such other buildings as might be added later. When the Agricultural building was completed it was also added to the central system and last year the new shop building was attached.

The aggregate is about 16,000 sq. ft. of radiating surface not counting mains and returns. It is probable that the plant would carry about 4,000 sq. ft. of additional radiation if it were favorably located. In other words, one moderate sized building added to the present plant would tax it to the full capacity.

Underground Mains.

The steam mains and return pipes are covered with insulating material and enclosed in conduits. The portion of the conduit between the Administration building and boiler house is built of brick, oval in form, and about 30 inches by 24 inches. The branches beyond the Administration building are enclosed in terra cotta sewer pipes just large enough to contain the steam pipes with their insulation. It is evident that renewal or repair of these pipes is a very difficult matter. Also inspection is practically impossible except in the short section of brick conduit. In my report of last February, I called attention to the fact that the pipes in this conduit might be expected to give way at any time on account of pitting and corrosion. This predication was verified last week when nineteen feet of the four and one-half inch return pipe had to be replaced by new pipe. Discoveries made during this repair indicate that other sections of this pipe are in bad condition and liable to fail at any time. In fact we shall consider ourselves fortunate if we can keep the plant going, without interruption to college work, until next summer when it will be necessary to make extensive repairs. The estimate for these repairs is given in another section of this report.

Boilers.

The boilers, of which there are two 60-inch and one 52-inch, are in good condition, having been well cared for and not overworked. With ordinary repairs such as renewals of grate bars and door arches, these boilers should be expected to do good service for many years.

Location of Plant.

In view of the present trend of progress in building, the plant is not well located for a permanent central heating station for several reasons:

1—The locations of the new buildings and proposed buildings are too distant for economical transmission of heat.

2—The present location and design of the plant are such that it cannot well be enlarged to meet the larger demands for heat.

3—It is very inconvenient and expensive to get fuel to the boilers. The present method of having wood delivered to the College by team can only be considered temporary, in view of the fact that the cost is constantly increasing and the near supply diminishing. Even if this were not the case there is no suitable place near at hand to store the vast quantity of wood required to operate the plant during the winter. It is practically impossible to reach the plant with a spur from the railroad. When it becomes necessary to dispense with wood as a fuel and adopt coal or oil, this latter consideration will be of prime importance.

These disadvantages have been largely brought about by the growth of the College and the direction of the lines along which expansion has occurred. Agricultural Hall, Waldo Hall, and the Agronomy building have all been located and built since the heating plant was installed. These buildings are within the zone which should be heated by a central station. Their aggregate radiation is 14,000 square feet in round numbers, or two-thirds the capacity of the present plant. The Agronomy building with over 4,000 square feet and Waldo Hall with 6,000 square feet are heated independently on account of distance and lack of capacity of the central plant to supply heat to them.

Taking these matters into account it appears to be a poor investment from an engineering point of view to put more money into the old plant than that which is necessary to keep it going until another plant can be provided in a location more suitable to meet the present and prospective requirements. Such a plant should be in accordance with the best modern practice and should be connected to the various buildings by tunnels large enough to permit the inspection and repair of pipes. The tunnels should also carry the various electric wires which are now strung upon unsightly poles about the campus.

Radiation.

The following is a detailed list of the radiating surface in the various buildings of the College. The first group comprises those buildings supplied by the present central plant.

	Radiation Sq. Ft.
Administration building	3,140
Agricultural Hall	3,839
Armory	2,010
Horticultural building and Greenhouse	1,587
Mechanic Arts building	3,170
Mechanical Hall	2,064
Mining building	370
Total	16,180
Not connected with main heating plant:	
Cauthorn Hall	1,350
Waldo Hall	6,000
Agronomy building	4,340
Shepard Hall	3,000
	14,690

Heated by stoves:

Pharmacy building and Mining laboratory.

It will be noted that exclusive of the buildings heated by stoves, we now have almost as much radiation heated independently as we have supplied from the central plant.

Cauthorn Hall.

It is doubtful if it would be profitable to heat Cauthorn Hall from a central station, on account of the distance and the nature of the building. However, the heating apparatus in this building is in bad condition. The boiler has been in continuous use since the building was first occupied in 1890. It should be reset next summer and the steam mains overhauled and given proper slope to prevent accumulation of water in them. I anticipate that it may be found necessary to replace the boiler by a new one.

Estimated cost per annum of heating College buildings.

Present Heating Plant, Fuel	$2,814.00	
Labor	450.00	$3,264.00
Waldo Hall, Fuel	900.00	
Labor	180.00	1,080.00
Shepard Hall, Fuel	390.00	
Labor	180.00	570.00
Agronomy building, Fuel	630.00	
Labor	180.00	810.00
Armory, for hot water, Fuel	75.00	
Labor	100.00	175.00
Pharmacy building, Fuel	187.00	
Labor	90.00	277.00
Cauthorn Hall, Fuel	500.00	
Labor	180.00	680.00
Total for one year		$ 6,856.00
Total for two years		$13,712.00

These estimates are based on wood at $3.75 per cord, except that used at the heating plant which is hauled in during the winter at a cost of about 60 cents per cord, making the total cost per cord at the heating plant $4.35.

Estimate of repairs to heating system for next two years.

Renewal of steam and return pipes in first section of conduit and return pipes in second section	$ 525.00

Repairs to boilers consisting of grate bars and arch liners	120.00
Repairs to heating plant for Cauthorn Hall which is practically worn out	500.00
Repairs on water and drain pipes at Waldo Hall	200.00
Miscellaneous repairs	100.00
Total	$1,445.00

The estimates for repairs to a worn out plant are likely to be far from the actual requirements, but the figures here given are the most reliable to be had at this time.

LIGHT AND POWER.

To make an accurate estimate of the outlay for power and lighting for the next two years is not an easy task. There are two reasons for this statement: (1) The College is growing so rapidly that it is difficult to estimate the extent of the requirements; (2) There are no exact records of past expenditures to follow in the matter.

Upon taking possession of the new shops last spring it became necessary to seek some other source of light and power than our own plant, the capacity of which was considerably exceeded. Accordingly, a contract was entered into with the Willamette Valley Company whereby they agree to supply current to the College at the switchboard for two cents per kilowatt hour with a specified minimum charge. It is also a part of the agreement that the College may use its engine and generator up to the full capacity in producing a part of the required current. This arrangement has been carried out quite satisfactorily except that the College generator is unable to carry the motor load on account of not having an automatic voltage regulator to take care of the variable motor load.

At the present time all of the current used for lighting is generated at the College plant, the exhaust steam being used for heating the buildings. Were it not for the fact that the exhaust steam is utilized in this way and that the attendance in the boiler room is practically the same whether the engine is running or not, it is certain that no economy would result from the use of the College plant in furnishing a part of the power. As the matter now stands we are probably justified in using it during the season when heat is required. The margin of gain even then is so small that in making the estimates for the next two years, I have estimated current at two cents per kilowatt hour whether generated at the College plant or purchased of the company.

The various shops and the printing office are supplied with three phase induction motors as follows:

Blacksmith shop, one 20 H. P. and one 10 H. P.	30 H. P.
Wood shop, two 15 H. P. motors	30 H. P.
Machine shop, one 20 H. P. motor	20 H. P.
Printing office, one 5 H. P. motor	5 H. P.
Total	85 H. P.

It is not at all probable that all of these motors will be running at their full capacity at the same time. I should say that 60 H. P. would be a fair estimate for the maximum.

In the following, power is estimated on the basis of eight hours per day during five days of the week for thirty-six weeks:

Estimated cost per year.

Blacksmith shop	$ 635.00
Machine shop	345.00
Wood shop, including an allowance for summer work	500.00
Printing office	75.00
Total	$1,555.00

Requirements for Lighting.

Observations recently made by Mr. Hawley indicate that the College now requires about 20 kilowatts for lighting. During the shortest days, lights are used seven hours a day. During the school year of thirty-six weeks, the average is about five hours per day. On this basis the average cost of lights per day is $2.00 or $504.00 per year. Allowing an increase of approximately ten per cent for the next two years, the amount is $550.00 per year.

Summary for Light and Power for two Years.

Current for power	$3,110.00
Current for lighting	1,100.00
Lamp renewals and repairs	200.00
Total	$4,410.00

An automatic voltage regulator would enable the College engine and generator to be used on the motor circuit as well as on the power circuit. I believe that it should be added to the equipment. The cost would be about $175.00, which is not included in the other estimates.

Respectfully submitted,

G. A. COVELL.

DEPARTMENTAL ESTIMATES OF REQUIREMENTS

FOR THE BIENNIUM

JULY 1, 1909 TO JUNE 30, 1911.

The following are estimates of the equipment, supplies, and additional instructors and assistants, required during the next two years, as prepared by the heads of the respective departments. While these estimates are very conservative and all the items given are badly needed, it has been found necessary, on account of the unavoidable large increase in the cost of maintenance, occasioned by the rapid growth of the institution, and the necessity of providing additional buildings, to make large reductions in the amounts given, as indicated elsewhere in this report. The cost of supplies is mostly covered by student fees, but the lists are given here as a matter of information.

AGRONOMY.

Additional Instructional Assistance—		
One instructor		$2,500.00
Equipment—		
For work in Crops, Crop Production, Cereal Crops, Agrostology:		
Cases for specimens of crop diseases, crop insects, and weed enemies	$ 50.00	
Cases for crop types specimens	20.00	
Cases for seed collections	50.00	
Five laboratory desks	100.00	
Dissecting microscopes	100.00	
Three analytical balances	140.00	
Seed separating machine	75.00	
Miscellaneous	144.00	679.00
For work in Irrigation and Drainage:		
One transit	$ 140.00	
Two R. R. levels	170.00	
Three measuring rods	45.00	
Six drawing tables	60.00	
Miscellaneous	55.00	470.00
For work in Soil Physics:		
100 Percolators	$ 55.00	
Sieves, aspirator, evaporating dishes, capillary tubes, apparatus for determining soil moistude, etc.	614.00	669.00
For work in Soil Fertility:		
Universal clamps, Bunsen burners, condensers, pipettes, filtering flasks, etc.		295.00
For work in Farm Mechanics:		
Shafting and pulleys, tractometer, draft apparatus, belting, tools, etc.		360.00
For work in Climatology:		
Thermograph	$ 75.00	
Standard barometer	50.00	
Wet and dry bulb thermometer, etc.	12.00	137.00

For general use in department:		
Stereoptican	$ 60.00	
Slides and curtain	40.00	
Two roll-top desks for office	100.00	
Bookcasing for offices	60.00	
Filing cases, desk chairs, and two tables	65.00	325.00
Books—		
Technical reference books for library		66.85
Supplies—		
Seed supplies, seed vials, labels, paper, etc.	$ 54.00	
Centerfuge tubes, themos, flasks, chemicals	100.00	
Lubricating oil, gasoline, lumber, cement, waste, etc.	117.00	
Crucibles, wire gauzes, etc.	58.64	
Stationery, stamps, etc., for office	220.00	549.64

ANIMAL HUSBANDRY.

Additional Instructional Assistance—		
One instructor		$2,400.00
Books—		
Technical reference books for library		50.00
Live Stock—		
Six Herefords	$1,000.00	
Six Ayrshires	900.00	
Six Holsteins	900.00	
One Galloway heifer	150.00	
One Aberdeen Angus heifer	150.00	
One team of Percheron mares	1,500.00	
One Poland China sow	50.00	
One Duroc Jersey sow	50.00	4,700.00
Supplies		50.00

HORTICULTURE.

Additional Instructional Assistance—		
One instructor	$1,800.00	
Student laboratory assistance	300.00	$2,100.00

Equipment—

Furniture for five offices, including desks, chairs, bookcases, cabinets, typewriter, etc.	$ 425.00	
Refrigerator for fruit storage	50.00	
Benches and desk for station laboratory	150.00	
Equipment for spraying, grafting, pomology, and vegetable gardening laboratories	500.00	
Drafting room tables	100.00	
Herbarium cases and press	50.00	
Lantern equipment	100.00	
Tools for budding, grafting, etc.	200.00	
Miscellaneous equipment	125.00	1,700.00

Books—

Technical reference books for library		100.00

Supplies—

Photography	$ 100.00	
Lantern slides	100.00	
Fruit packing material, nursery material, etc.	125.00	
Incidentals	200.00	525.00

DAIRY HUSBANDRY.

Additional Instructional Assistance—

One instructor	$2,400.00	
Special instructors	750.00	
Student assistance	250.00	$3,400.00

Equipment—

Cream separators	$ 150.00	
Two 100-gallon steel and copper cheese vats	160.00	
Automatic cream ripener	190.00	
Starter can	40.00	
American butter printer	25.00	
Babcock tester, with electric motor	75.00	
Set pipe-fitting tools	20.00	
Acid carboy trunion and small butter printer	7.50	
Reading room and museum fixtures	100.00	
Office fixtures and supplies	100.00	867.00

Books—

Technical reference books for library		75.00

Supplies—

Sulphuric acid and other chemicals	$ 125.00	
Glassware for test room	200.00	
Milk and cream	150.00	
Buttermaking and cheesemaking supplies	150.00	
Wood, 25 cords at $4.00	100.00	725.00

POULTRY HUSBANDRY.

Additional Instructional Assistance—

One student assistant		$ 500.00

Improvements—

House for fowls and providing fruit and shade trees		250.00

Equipment—

Fowls of different breeds	$ 100.00	
Charts, slides, etc.	100.00	
Carpenters' tools	20.00	
Two desks	50.00	
Bone cutter	30.00	
Clover cutter	15.00	
Cramming machine	25.00	340.00

Supplies—

Feed for fowls	$ 125.00	
Lumber and material for houses and appliances to be built by students	200.00	
Coal oil for incubators and brooders	50.00	
Printing records, score cards, etc.	25.00	400.00

AGRICULTURAL CHEMISTRY.

Additional Instructional Assistance—

One-half time of one instructor		$1,000.00

Repairs—

Removing partition	$ 25.00	
Installing three desks	150.00	
Providing new drawers in present desks	50.00	
Providing two iron supporting posts	40.00	
Installing hoods and sink	65.00	330.00

Equipment—

5 Quantitative balances	$ 200.00	
1 Westphal balance	12.00	
Balances and weights	60.00	
4 Platinum dishes, large	100.00	
8 Platinum dishes, small	50.00	
Drying ovens	40.00	
1 Nitrogen still	33.00	
1 Fat extraction apparatus	30.00	
Muffle furnaces and Erdman muffles	40.00	
1 Gasoline tank and 2 Richard's pumps	38.00	
2 Hot plates	20.00	
40 Bunsen burners	15.00	
1 Set hydrometers	15.00	
1 Calorimeter	80.00	
3 Sets soil sieves	15.00	
30 Ring stands	60.00	
Thermometers and tripods	22.00	
4½ Gross reagent bottles	61.00	
10 Doz. porcelain crucibles	30.00	
3 Doz. desicators	21.00	
30 Burette stands	75.00	
3 Doz. Burettes	31.00	
Funnels, common and separatory	52.00	
6 Doz. graduated flasks	33.00	
3 Doz. mortars	10.00	
9 Doz. pipettes	20.00	
1 Gross evaporating dishes	48.00	
Kjeldahl and Florence flasks	34.00	
90 Nests beakers	30.00	
2 Doz. potash bulbs	30.00	
Casseroles and Nessler jars	25.00	
3 Doz. filter flasks	15.00	
4 Doz. graduated sylinders	40.00	
3,500 filters	15.00	
2 Doz. soxlet extractors	30.00	
Specific gravity bottles and cylinders	10.00	
Miscellaneous small apparatus	116.00	1,556.00

Supplies—

Chemicals	350.00

DOMESTIC SCIENCE AND ART.

Additional Instructional Assistance—

Assistant in Science (one year)	$1,000.00	
Assistant in Cookery	1,600.00	
Assistant in Dressmaking, and Tailoring	2,000.00	$4,600.00

Equipment—

For Science Laboratory:

10 compound microscopes	$ 400.00	
Bacteriological equipment, chiefly glassware	50.00	
Miscellaneous equipment	50.00	
Physical apparatus	100.00	
Hygiene and Home Nursing equipment	500.00	1,100.00

Kitchen and Dining Room:

18 gas burners and miscellaneous equipment	$ 40.00	
12 tables	24.00	
Gas stove	20.00	
Utensils, burners, etc.	52.00	
China	20.00	
Silver, curtains, rug, serving table	34.00	
Side board	20.00	
Chairs	45.00	255.00

Sewing, Dressmaking, Tailoring, Millinery, etc.:

Tables and chairs	$ 90.00	
6 sewing machines	118.00	
600 pounds of drafting paper	30.00	
2 doz. drafting squares and 4 doz. scissors	72.00	
Cases for exhibition of materials and work	50.00	
Looms	50.00	
Exhibition material in basketry, tapestry, weaving, etc.	50.00	460.00

Books		100.00

Supplies—

Reed, raffia, jute, twine, rope, grasses, etc.	$ 125.00	
Wire, braids, etc.	50.00	
Supplies for cooking laboratories, office, etc.	425.00	600.00

MECHANICAL ENGINEERING AND SHOPS.

Additional Instructional Assistance—

Instructor in Moulding and Foundry Practice	$2,000.00	
Instructor in Wheelwright Work	2,000.00	
Instructor in Plumbing and Pipe-fitting	2,000.00	
Assistant in Wood Shop	1,400.00	
Student assistance in Mechanical Drawing	600.00	$8,000.00

Equipment—

For work in Hydraulics:

1 Breslau water meter, two-inch	$ 85.00	
1 Worthington water meter, two-inch	100.00	
1 Centrifugal pump	75.00	
2 Gas meters	60.00	
Pelton wheel, hydraulic ram, gauges, etc.	158.00	478.00

For work in Steam Engineering:

1 Standard mercury column	$ 25.00	
3 Pressure gauges, 100-lb., 200-lb., and 300-lb.	60.00	
1 Separating calorimeter	50.00	
1 Electric Pyrometer	95.00	
1 Doz. 12″ thermometers	20.00	
1 Continuous calocimeter	50.00	
2 Steam Engine indicators, reducing wheel attached	190.00	
1 Plain slide valve engine 6″ x 8″	250.00	
1 20 H. P. surface condensor with pumps	300.00	
Steam and vacuum gauges, and other miscellaneous equipment	178.00	1,218.00

For work in Gas Engineering:

1 5 H. P. gas engine	$ 150.00	
1 Gas engine indicator with reducing motion	100.00	
1 Air compressor, 6″ x 6″—8″ with storage tank	300.00	
1 Rider Ericsen hot air engine	150.00	
1 Fuel calorimeter and apparatus for gas analysis	130.00	830.00

For work in Power Measurements:

2 Fairbank's Standard Platform scales	$ 60.00	
1 Transmission dynamometer	150.00	

1 Tachometer	65.00	
1 5 H. P. induction motor	80.00	
Speed indicators and other small apparatus	70.00	425.00

For work in Lubricants:

Oil testing machine	$ 175.00	
Cold test apparatus	30.00	
Viscometer	40.00	
Miscellaneous apparatus	20.00	265.00

For work in Strength of Materials:

1 Paine Extensometer	$ 25.00	
1 Set standard weights	10.00	
1 Set seives, and specific gravity Bot.	25.00	
1 Chemical balance	50.00	
Miscellaneous apparatus	11.00	
1 Machine for grinding cubes for testing machine	350.00	471.00

For Wood Shop:

20 Wood turning lathes at $40.00	$ 800.00	
Tool cabinets for same (made in Shops)	93.00	
1 Heavy band saw for re-sawing	325.00	
1 Surface planer	350.00	
1 Band saw swage and sharpener	30.00	
1 Circular saw swage	30.00	
3 Universal patternmaker's vises	45.00	
10 Pair Herriman's vises	110.00	
1 Circular saw hammering outfit	40.00	
3 Circular saws	20.00	
3 Band saw blades and 2 grindstone dressers	11.00	
9 Sets common hand tools at $5.92	53.28	
9 Sets Special tools needed to complete present equipment	54.00	
40 Combination steel rules	44.00	
40 Bevel gauges and 24 oilers	24.80	
25 Combination steel rulers for lathes	27.50	
25 Oilers for lathes	5.00	2,062.58

For Blacksmith Shop:

1 Power hammer	$ 275.00	
1 Combined punch and shear	130.00	
Pulleys and shafting	30.00	435.00

For Machine Shop:

6 14″ lathes (engine)	$2,730.00	
1 14″ Turret lathe	825.00	
1 Sensative drill	60.00	
1 12″ Crank shaper	350.00	
1 14″ Power hack saw	75.00	
1 Electric center grinder	50.00	
1 Wet tool grinder	225.00	
8 Machinists' vises	96.00	
2 10″ 4-jaw combination chucks	30.00	
6 10″ and 1 6″ plain chucks	82.00	
4 3″ tail stock chucks	32.00	
1 ½″ Drill press chucks	5.00	
1 Set standard disc and plug gauges	75.00	
4 Micrometer calipers	24.00	
1 Micrometer square	5.00	
Cutters for milling machine and expanding mandrels	40.00	
3 Doz. ball peen hammers 1¾lb.	27.00	
3 Doz. solid steel squares 1½″	54.00	
3 Doz. adjustable steel squares 4″	89.00	
2 Doz. 6″ steel scales	10.80	
5 Doz. 10″ steel scales	45.00	
4 Doz. Center gauges	9.60	
5 Doz. Armstrong tool holders (Square)	75.00	
5 Doz. Armstrong tool holders (cutting off)	69.00	
4 Doz. outside, and 4 doz. 4″ inside calipers	57.60	
5 Doz. slip oil stones	15.00	
3 Doz. 12″ hand bastard files	32.10	
3 Doz. 12″ second cut files	34.50	
3 Doz. 12″ hand smooth files	40.50	
5 Doz. 6″ pillar smooth files	16.25	
5 Doz. 8″ half round smooth files	44.50	
5 Doz. 5″ square second cut files	23.00	
Assorted small files	5.00	5,351.25

For Foundry:

1 30″ Cupola complete	$ 625.00	
1 Core oven 6′ x 6′	80.00	
1 Brass furnace and crucibles	125.00	
2 Large pouring ladles	40.00	
10 Small pouring ladles	35.00	
10 sets of tools consisting of shovel, rammer, brushes, sieves, trowel, slick, and pulling tools	57.50	962.50

For Wheelwright Shop:

10 Bench sets, consisting of vise, planes, draw knife, bitts, brace, auger, squares, chisels, saws, etc., at $41.65 per set	$ 416.50	
2 8″ sledges, 2 10″ sledges, bench hatchets, clamps, tire shrinker, tire bender, clippers, etc.	84.50	
1 Combined punch and shear	35.00	
1 Drill press	50.00	
2 Tire bolters	15.00	
3 Tire measuring wheels	3.00	
1 Green River screw plate	16.00	
2 Blacksmith vises	15.00	
2 Swedge blocks	12.00	
1 Power grindstone	35.00	
1 Emery grinder	30.00	
1 Pressure blower	40.00	
1 Set small tools consisting of swedges, fullers, chisels, etc.	20.00	
Shafting, hangers, pulleys and belting	75.00	
Remodelling six old forges at $12	72.50	
1 10 H. P. three phase induction motor	235.00	
10 Benches with drawers	120.00	1,274.00

Miscellaneous:

1 Electric blue print machine, 42″ x 72″	$ 220.00	
1 Vacuum printing frame, 38″ x 50″	80.50	
50 Wire mesh window guards for wood and machine shops	156.00	
2 Cabinets for drawing department and benches, drawers, etc., for Eng. Lab. (to be made in the Wood Shop)	83.00	
Book case, cabinet, and furniture for Dean's office	125.00	664.50

Equipment for Drafting Room.

40 Drawing tables		280.00

Books—

Technical reference books for library		125.00

Supplies—

For Wood Shop:

20,000 feet yellow fir lumber @ $35	$ 700.00	
10,000 feet oak lumber @ $50	500.00	

10,000 feet pine @ $45	450.00	
8,000 feet alder @ $40	320.00	
5,000 feet other lumber @ $50	250.00	
Dowels	25.00	
Glue	30.00	
Wood and leather fillet for patterns	25.00	
Finishing materials	200.00	
Hardware	200.00	
Upholstering materials	125.00	
Miscellaneous material used in copper, brass, and Venitian iron work	100.00	2,925.00

For Blacksmith Shop:

19,800 lbs. of iron and steel	$ 680.00	
50 tons blacksmith coal @ $17	850.00	1,530.00

For Machine Shop:

4,000 lbs. castings	$ 200.00	
Wrought iron, steel, and brass	125.00	
Files, screws, and nuts	150.00	
2 Bales cotton waste	12.00	
1 Barrel machine oil	18.00	505.00

CIVIL ENGINEERING.

Additional Instructional Assistance—

One instructor	$2,400.00	
Two field assistants at $600 each per year	2,400.00	4,800.00

Books—

Technical reference books for library		500.00

Equipment—

1 Precision level	$ 190.00	
2 Planetables, complete @ $177.70	355.40	
2 Dumpy levels @ $110.00	220.00	
2 Y levels @ $140	280.00	
2 Transits with solar, etc., @ $325.00	650.00	
Plain transits (4) @ $180	720.00	
1 Aneroid barometer	55.00	
1 Aneroid barometer	20.50	
1 Sextant	90.00	
10 Tapes, 100 feet	42.25	

1 Tape, 500 feet	20.00	
4 Tapes, 66 feet	11.00	
5 Tapes, 50 feet	12.50	
12 Axes	15.00	
1 Blue print frame and outfit	125.00	
36 Drawing boards	36.00	
6 Level rods	84.00	
Flagpoles, pocket compasses, thermometers, rod levels, and minor instruments	75.00	
1 Current meter	80.00	
Equipment for instrument room	125.00	3,206.65

Repairs—

Miscellaneous repairs on instruments, etc.	25.00

Supplies—

Blue print paper for two years	$ 40.00	
Drawing paper	40.00	
Tracing paper and cloth	35.00	
Notebooks (300)	165.00	
Incidentals	200.00	480.00

ELECTRICAL ENGINEERING.

Additional Instructional Assistance—

One instructor	2,600.00

Equipment—

6 Thompsons indicating wattmeters with multipliers	$ 540.00
2 High grade millivoltmeters and shunts 10, 50, M. V.	120.00
10 Ordinary millivoltmeters and shunts 10, 10, 20, 20, 25, 25, 40, 40, 50, 50, M. V.	300.00
10 A. C. Ammeters, 5, 5, 5, 10, 10, 10, 30, 30, 30, 50	250.00
10 D. C. Ammeters, 5, 5, 5, 10, 10, 10, 30, 30, 30, 50	250.00
1 3 Phase G. E. 10 K. W. Double Current generator set	530.00
2 C. E. Alternating current generator sets	1,650.00
2 10 K. W. D. C. Generators complete	750.00
4 10 K. W. 3 Phase induction motors	875.00
1 Standard testing set, Bridge and galvanometer	140.00

1	Ordinary testing set, Bridge and galvanometer	110.00	
1	10 K. W. arc transformer	175.00	
6	5 K. W. transformers	600.00	
6	Types of arc lamps at $18.00	108.00	
8	Types of watt hour meters at $16.00	128.00	
3	Electrodynamometers at $30.00	90.00	
1	Three phase oscillograph complete	750.00	
1	Power factor meter	60.00	
1	Frequency meter	60.00	
1	Synchuoscope	60.00	
1	Ohmmeter	90.00	
1	Kelvin static voltmeter for high voltages	80.00	
1	Kelvin multi-cellular voltmeter for low voltages	150.00	
1	Hystersis meter	110.00	
1	Static ground detector	60.00	
3	Types of telephone switchboards complete with instruments and other apparatus	400.00	
2	Wireless telegraph sets including induction coils, etc.	250.00	
1	Storage battery	310.00	
1	Standard Condenser 1-M. F.	90.00	
2	Condensers 1-M. F. at $45.00 ea.	90.00	
1	3 Phase 70 Amp. circuit breakers	90.00	
1	3 Phase 10 K. W. transformer	225.00	
3	D. P. Single phase circuit breakers	63.00	
5	D. P. Direct current circuit breakers	100.00	
5	Rheostats for testing dynamos at $25	125.00	
3	Potential transformers at $15	45.00	
3	Current transformers at $15	45.00	
2	Tirrell regulators at $150	300.00	
1	Transmission dynamometer	100.00	
1	Slip Meter	65.00	
1	Class room lantern complete	175.00	10,509.00

Books	430.00
Supplies—	
Wire, rosettes, sockets, small castings, etc.	1,000.00

MINING ENGINEERING.

Additional Instructional Assistance—	
One instructor	1,300.00

Equipment—

3 Mining transits complete	$ 825.00	
2 Tapes, 300 feet	30.00	
Tapes, 4 100 feet	32.00	
4 Tapes, 50 feet	16.00	
6 Axes	6.00	
2 Solar attachments	100.00	
1 Shaft plumbing apparatus	25.00	
Collection of rocks for Lithology	150.00	
Cases for same	60.00	
2 Brunton transits	50.00	
1 Aneroid barometer	30.00	
2 Petrographic microscopes	300.00	
Collection of rock sections	80.00	1,704.00
Books		395.00

Supplies—

Supplies for Mineralogy and Assaying	800.00

COMMERCE.

Additional Instructional Assistance—

Instructor in Penmanship and Accounting	$1,600.00	
Student labor	500.00	
Increase in salary of instructor in Stenography	300.00	2,400.00

Improvements—

1 Corbin door check	$ 4.00	
50 Lockers	150.00	154.00

Equipment—

20 Typewriter stands	$ 110.00	
50 Chandler's Adjustable chairs	145.00	
Express and materials for Commercial Museum	100.00	
Equipment for Commercial Museum and department Library shelving, cases, and bottles	200.00	
Globe Wernicke Filing Cabinet (4 sections)	90.00	
10 Sets inkwells @ $2.00	20.00	
Books for Offices, rubber stamps, etc	50.00	
Equipment for exhibits, cases, etc	25.00	740.00
Books for Library		200.00

Supplies—

Ink, paper, pens, etc.	$ 400.00	
Rental on twenty machines	500.00	900.00

FORESTRY AND BOTANY.

Additional Instructional Assistance—

Assistant in Botany	$1,000.00	
Assistant Professor of Forestry	2,400.00	3,400.00

Land—

Forest and nursery (40 acres)		4,000.00

Equipment—

For Office:

Filing cases	$ 62.50	
Desk	35.00	
Chairs	14.00	
Table	8.00	119.50

For Botany

Tables, single, for laboratory	$ 128.00	
Chairs, revolving	48.00	
Herbarium cases	250.00	
Cases for botany sets	65.00	
Lockers for microscopes	325.00	
12 Individual laboratory sets	318.60	
Transpiration shells	7.50	
Spectroscope	18.00	
Leafclasps	6.50	
Manometer and light screen	11.00	
Photosynthometer	5.00	
Cambridge app boxes (30)	21.50	
Assortment laboratory supports	50.00	
Cambridge clinostat and polymeter	30.00	
Psychograph, Draper	30.50	
Photometer and Self-recording thermometer	35.00	
Sun recorder	35.00	
Thermograph	30.00	
Dissecting microscopes (10)	120.00	
Compound microscopes (8)	440.00	
Miscellaneous small pieces	15.55	1,989.05

For Forestry:

*1 Riehle testing machine	$ 800.00	
*1 Tinius testing machine	400.00	
*1 Circular saw complete	120.00	
1 Drying oven	80.00	
1 Weighing scale	65.00	
1 Deflectometer and scales	30.00	
1 Micrometer	30.00	
5 Calipers	25.50	
2 Clinometers	13.00	
Mountain barometer	56.25	
2 Hypsometers	48.00	
3 Steel tapes	27.00	
3 Increment borers	18.00	
Binocular	54.00	
2 Compasses	31.00	
2 Field balances	14.00	
2 Horses	250.00	
2 Pack saddles and blankets	30.00	
Saddle and hobbles	30.00	
Tents and flies (3)	50.00	
Camp and kit extras	48.00	
Set of small tools	100.00	
Miscellaneous small items of equipment	38.75	
Three pack straps	6.00	
2 Nose bags	2.00	
Watson plant presses and Cambridge picks	11.75	
Branton pocket transit	25.00	
Camera for field work	112.00	
Chairs, revolving, tablet, and stools	116.00	
Tables, single and special for laboratory (24)	232.00	
Seed cases	25.00	
Storage cupboards	60.00	
Supply cupboards	80.00	
Lantern slides	35.00	
Miscellaneous small pieces	29.75	3,093.00

Books—

For Botany	$ 32.00	
For Forestry	500.00	532.00

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*Mechanic Arts equipment to be used instead of purchasing these items for Forestry.

Supplies—

For Botany	$ 131.65	
For Office	9.60	
Forestry	33.30	174.55

PHARMACY.

Equipment—

1 Gross Erlenmeyer flasks	$ 20.00	
5 Gross Ointment boxes	10.00	
1-6 Gross Thermometers	24.00	
1-6 Gross Mortars	22.00	
1-6 Gross Glass funnels	15.00	
5 Gross Collapsible tubes	40.00	
25 lbs. corks	15.00	
2-3 Gross Evaporating dishes	30.00	
2-3 Gross Spatulas	20.00	
5 Gross assorted bottles	25.00	
2 Gross reagent bottles	20.00	
1-6 Gross percolators	11.00	
1-6 Gross gas burners	24.00	
1-12 Gross Precip. jars	15.00	
1-3 Gross graduates	40.00	
1 Machine for coating pills and tablets	40.00	
1 Steam jacketed kettle	50.00	
4 Balances	80.00	
4 Sets weights	12.00	
1 Numbering machine	5.00	
1 Supposit. machine	10.00	
1 Drug mill	45.00	
1 Motor and outfit	165.00	
Glass tubing	15.00	
Rubber tubing	20.00	773.00

Books and periodicals for library	66.00

Supplies—

Chemicals, crude drugs, and general supplies	750.00

ZOOLOGY.

Additional Instructional Assistance—

One instructor	$2,400.00	
Student assistance	200.00	2,600.00

Equipment—

38 Laboratory tables (4 students each) @ $40	$1,520.00	
60 Compound microscopes @ $50	3,000.00	
60 Dissecting microscopes @ $12	720.00	
24 Sets desk equipment @ $10	240.00	
5 Demonstration tables	150.00	
1 Long reading table	30.00	
8 Hand microtones @ $6	48.00	
75 Laboratory chairs	225.00	
150 Lecture room chairs	350.00	
1 Aquarium table and equipment	100.00	
Models, charts, and slides	100.00	
100 Dissecting boards @ 75c	75.00	
50 Exhibition cases for collections	100.00	
Wall cases, lockers, etc., for laboratory	250.00	
Hoods, special plumbing, etc	200.00	
Office furniture	300.00	
Miscellaneous equipment	161.00	7,569.00

Books for Library—

Biology	$ 75.00	
General Zoology	100.00	
Vertebrate Zoology, game animals, birds & fishes	75.00	
Physiology and anatomy of domestic animals	50.00	
Human physiology, hygiene and sanitation	150.00	
Psychology and ethics	50.00	
Embryology	75.00	
Principles of breeding	50.00	
Entomology, forest insects, crop pests, etc	400.00	1,025.00

Improvements—

Insectary	1,500.00

Supplies—

General supplies for department; also including bee hives, etc., for work in Bee Keeping	400.00

CHEMISTRY.

Additional Instructional Assistance—

Three instructors ($1,000 each)	6,000.00

Improvements—

Providing small individual hoods on desks in laboratory	$ 150.00

Putting floor in general laboratory	100.00	
Plumbing	175.00	
Kalsomining laboratories and recitation rooms	150.00	
Enlarging Organic laboratory, etc.	125.00	
Enlarging stock room	50.00	
Providing closets	50.00	
Arranging lights in general laboratory	75.00	
Arranging hoods in Organic laboratory	50.00	
Installing dumb waiter from stock room	100.00	
Installing sinks in laboratories	75.00	1,100.00

Equipment—

Small boiler for distilling water	$ 200.00	
Small motor and fan for ventilation	75.00	
Desks, etc., for Quantitative laboratory	300.00	
Filing cabinet for office	60.00	
Book case for department	50.00	
Desk for instructor	35.00	
Table for office	15.00	
Window blinds for laboratory	30.00	765.00

Books for Library	200.00

Supplies—

Chemicals and other general supplies	7,922.00

BACTERIOLOGY.

Additional Assistance—

Student laboratory assistance	600.00

Equipment—

25 Glass top tables	$ 200.00
1 Lead covered dissecting table	10.00
25 Screw top stools	80.00
4 Cupboards for glassware	60.00
50 Student lockers	100.00
2 Metal covered benches, with hoods, etc	60.00
2 Benches and hoods for incubator room	40.00
Office desks, chairs, etc.	61.00
15 Compound microscopes	1,500.00
15 Dissecting microscopes	180.00
15 Reserve flame burners	30.00
15 Sets reagent bottles	30.00

1 Microtome	75.00	
1 Set fine balances with weights	60.00	
1 Set coarse balances and weights	15.00	
Dissecting knives, scissors, needles, etc.	45.00	
3 Doz. test tube baskets	14.40	
6 Doz. Fermentation tubes, large size	25.00	
Fermentation tubes, medium and small sizes	45.00	
6 Gross test tubes	27.00	
Beakers and glass jars	126.00	
1 Gross pasteur dishes	36.00	
Forceps, trays, etc.	30.00	
2 Autoclaves, large and small	130.00	
3 Arnold Stema sterilizers	52.00	
2 Hot air sterilizers	90.00	
1 Medium sized incubator	50.00	
1 Large sized incubator	100.00	
Other small items of apparatus	673.30	3,944.70

Books—

Technical books for library	121.95

Supplies—

Cover glass and cotton batting	$ 43.75	
Parchment and filter paper	20.00	
Rubber tubing, cork stoppers, etc.	25.00	
Gelatine, albumen, balsam, charcoal, etc.	17.00	
Blue wax pencils	9.00	
Miscellaneous supplies	83.05	
Stains, acids and other chemicals	252.43	450.23

PHYSICS.

Additional Instructional Assistance—

Three instructors at $900 per year for each	5,400.00

Equipment—

For Lecture Purposes:

General apparatus:

Frames, stands, etc. (can be made in College Carpenter Shop)	$ 25.00
Projection lantern and accessories, including table with adjustable top, etc.	325.00
Electric whirling table	45.00

Two cylinder Geryk air pump 2" x 5"	150.00	
Air pump accessories	50.00	595.00
Mechanics:		
Whirling table accessories	$ 25.00	
Apparatus for work in hydrostatics	50.00	
Barometer	5.00	
Working models of pumps	20.00	
Wave apparatus for projection lantern	20.00	
Set of cohesion frames	4.00	
1 three-foot iron wheel, mounted on stand	25.00	149.00
Heat:		
Clamp to show contraction of iron	$ 3.00	
Pressure pump, 1000 atmospheres	150.00	
Auxiliary apparatus to liquify gases	50.00	
Other small apparatus	15.00	218.00
Sound:		
Tuning forks, singing flames, set Chladni's plates, etc.		52.00
Light:		
Optical bench and accessories	$ 600.00	
Kaleidoscope	10.00	
Set crossed prisims	20.00	
Miscellaneous apparatus for work in light	55.00	685.00
Electricity and Magnetism:		
Electrostatic apparatus, different shaped conductors, large electroscope, etc.	$ 50.00	
3 Crook's tubes, various patterns	50.00	
Calladon's fountain	15.00	
Nernst glowers and ballasts	15.00	
Miscellaneous small pieces of apparatus	110.00	240.00
For Laboratory Purposes:		
General:		
Clamps, rods, ring stands, etc.	$ 100.00	
Laboratory clock	60.00	
3 Telescopes	36.00	
Platinum	20.00	
Water still	25.00	
Miscellaneous small items	13.00	254.00

Mechanics:		
4 Vernier calipers	$ 26.00	
4 Micrometer calipers	26.00	
2 Sets weights	20.00	
2 Micrometer microscopes, mounted separately	65.00	
2 Jolly balances	50.00	
Miscellaneous small items	46.90	233.90
Heat:		
3 Hypsometers	$ 33.00	
1 Specific heat apparatus	11.00	44.00
Sound:		
2 Large tuning forms with style	$ 10.00	
5 Tuning forms on resonators	35.00	45.00
Light:		
Standard amylacetate lamp	$ 15.00	
3 Spectrometers at $80	240.00	
4 Spectral tubes	8.00	
Mercury arc lamp	20.00	
Grating replica	8.00	291.00
Electricity and Magnetism:		
Clark, and Cadmium standard cells	$ 20.00	
Silver voltameter with platinum cup	30.00	
Electrodynamometer	57.00	
4 Telephone receivers	30.00	
Switchboard voltmeters and ammeters	44.00	
5 Wall rheostats	50.00	
Standard microfarad	140.00	
1 Adjustable microfarad	35.00	
Variable standard of self and mutual induction	160.00	
Wolff standard resistances	40.00	
2 Wolff resistance boxes	200.00	
1 Wolff wheatstone bridge, six decades	200.00	
1 Kelvin balance	240.00	
Miscellaneous small items	75.50	1,321.50
Repairs—		
Making repairs in laboratory, providing better artificial lighting, electric wiring, shelving, etc		205.00
Books and periodicals for Library		122.95

Supplies—

Chemicals, glassware, glass tubing, rubber tubing, etc.	$ 100.00	
Planes, drills, nails, screws, etc.	50.00	
Brass and iron rods for making instruments	50.00	
Copper, brass, and piano wire	50.00	
Switches, lamp cords, sockets, etc.	50.00	
Thermometers	25.00	
Castings, for various special pieces of apparatus and machine work	100.00	
Odds and ends and running expenses, freight, etc.	500.00	
Miscellaneous small supplies	42.00	967.00

MATHEMATICS.

Additional Instructional Assistance—

Two instructors (one not employed until year 1910-1911)	$2,800.00	
Student assistance	200.00	3,000.00

Equipment—

Blackboard compasses, etc.	$ 10.50	
Miscellaneous equipment	40.00	50.50

Books—

Webster's Academic dictionaries for teachers	$ 9.00	
Mathematical dictionaries	15.00	
Other books for Mathematical library	100.00	124.00

ENGLISH.

Additional Instructional Assistance—

Four instructors at $900 each per year		7,200.00

Equipment—

4 Book cases	$ 60.00	
3 Dictionaries	45.00	
1 Wall map of Europe, 1 map of U. S., and 1 of Asia	8.50	113.50

Books—		
English reference books	$ 403.50	
Books and material for debates	200.00	603.50

MODERN LANGUAGES.

Additional Instructional Assistance—	
Instructor for 2 years (part time only during first year)	1,500.00
Books—	
Reference books for departmental library	132.80
Supplies—	
Miscellaneous supplies, stationery, etc.	20.00

HISTORY.

Books—	
Reference books for library	2,000.00

ART.

Additional Instructional Assistance—		
One instructor		2,000.00
Equipment—		
Class studio furniture	$ 320.00	
Lockers	100.00	
New casts	150.00	570.00
Books for library		200.00
Supplies—		
Stationery, etc.		25.00

PHYSICAL EDUCATION.

Additional Instructional Assistance—	
Instructor in Indoor Gymnastics	2,000.00

Equipment—

For Gymnasium:

3 Horizontal bars @ $80	$ 240.00	
6 Climbing ropes @ $8	48.00	
2 Vaulting horses @ $120	240.00	
2 Vaulting bucks @ $90	180.00	
1 Spring board	45.00	
1 Pole vaulting board	16.00	
1 Kick standard	12.00	
1 Set flying rings	14.00	
2 Parallel bars @ $37.50	75.00	
2 Suspended parallel bars @ $30	60.00	
4 Mats, 5 x 10′ @ $30	120.00	
100 pairs 1-pound dumbells and hooks @ 75c	75.00	
10 Medicine balls @ $6	60.00	
600 Lockers @ $3	1,800.00	2,985.00

For Physical Training for Women:

Anthropometric apparatus	$ 125.00	
Office fixtures	100.00	
Girls' athletic field—basketball court	400.00	625.00

Supplies—

Office supplies, stenographic work, and small items of repairs	1,000.00

MILITARY SCIENCE AND TACTICS.

Additional Assistance—

Retired non-commissioned officer to take care of ordnance, etc.	1,000.00

Equipment—

Arm racks with canvas covers for 720 rifles	$ 112.00	
3 Tables for battalion officers	27.00	
3 Tables for regimental officers	41.50	
40 Sabres for use of cadet officers	500.00	680.50

Supplies—

Stationery, printing, etc.	30.00

LIBRARY.

Assistance—

Assistant Librarian	$1,800.00	
Student assistance	300.00	2,100.00

Equipment –

6 Stacks @ $40	$ 240.00	
Blank catalogue cards	29.50	
Library of Congress printed cards	200.00	
Periodical record and guide cards	5.00	
Catalogue case (60 tray)	130.00	
Shelving for Reading Room	100.00	
Periodical racks	75.00	
Small cases, trays, pamphlet cases, book supports, shelf label holders, etc.	37.50	
Periodical temporary binders	75.00	
Pamphlet covers	11.00	
Postal scales	5.40	
Miscellaneous	100.00	1,008.40

Books—

General books, exclusive of department estimates	$1,000.00	
Current periodicals	800.00	
Binding of periodicals and bulletins	1,000.00	
General collection for Reading Room	500.00	
Back numbers of technical journals, etc.	500.00	
General binding	100.00	
Sociology, government, etc.	200.00	
History and biography	400.00	
Useful arts	200.00	
Science	200.00	
Travel and geography	200.00	
Art	100.00	5,200.00

Supplies—

Postage	$ 100.00	
Miscellaneous supplies, ink, erasures, book varnish, typewriter ribbons, etc.	100.00	
Printing	50.00	
Book repair material	20.00	270.00

REGISTRAR'S OFFICE.

Assistance—		
Clerical assistance for Registrar's office and for Attendance Committee		1,000.00
Equipment—		
Matriculation and other books		45.00
Supplies—		
Printing blanks for office	$ 30.00	
Class roll books and paper	80.00	
Stationery, stamps, etc.	75.00	185.00
Mailing—		
Mailing catalogues and other special circulars		1,500.00

DEPARTMENTAL STENOGRAPHIC ASSISTANCE.

School of Agriculture—	
Dean of School and heads of Agricultural Departments	1,500.00
School of Engineering and Mechanic Arts—	
Dean of School and heads of all Engineering Departments	500.00
School of Domestic Science and Art—	
Dean of School and Domestic Science and Art faculty	250.00
Extension Work—	
Stenographic and other clerical assistance	1,400.00

PRINTING PLANT.

Assistance—		
Labor		800.00
Equipment—		
1 Miehle press with all necessary fixtures, (F. O. B. Corvallis)	$2,739.00	
1 32-inch Oswego power paper cutter	411.50	
1 Perforation power wire stitcher, ¾-inch	300.00	3,450.50
Supplies—		
Paper stock, ink, etc		6,000.00

JANITORIAL.

Labor—		
Regular and student labor		7,700.00
Supplies—		
Floor brushes, towelling, soap, toilet paper, pails, dust pans, etc.	$1,270.60	
Oiling floors	600.00	1,870.60

CAMPUS.

Assistance—		
Florist	$1,800.00	
3 Laborers, including teamster	3,600.00	
Student labor (50 hours per week)	780.00	6,180.00
Equipment—		
For Greenhouses:		
Pots	$ 200.00	
New plants	150.00	
Tools	170.00	570.00
For Campus:		
Tools	$ 120.00	
Cold frames	175.00	
Nursery stock	100.00	
Horse, dump cart, and harnesses	300.00	
Express wagon	150.00	
Lawn mower	15.00	
Hose	50.00	
Blacksmithing	110.00	
Miscellaneous equipment	250.00	1,100.00
Maintenance of new Greenhouses—		
Coal	$ 250.00	
Paint and putty	50.00	
Night firing	60.00	360.00
New Work on Campus—		
Piping (2730 feet)	$ 204.75	
Drainage	400.00	
Waldo Hall	1,500.00	

Agricultural building	1,000.00	
Gravel	350.00	
Miscellaneous work on old campus	350.00	3,804.75

WALDO HALL.

Equipment—

Furniture for student rooms:

120 Dressers @ $12	$1,440.00	
145 Rocking chairs @ $2.75	398.65	
120 Tables @ $2.75	329.90	2,168.55

Furniture for Dining Room:

200 Chairs @ $2.00	$ 400.00	
6 Tables at $4.00	24.00	424.00

Furniture for Parlors:

4 Chairs @ $15	$ 60.00	
3 Rugs @ $50	150.00	210.00

Kitchen:

1 Pantry sink	$ 25.00	
1 Milk cooler	50.00	
7 Window shades	5.25	
Miscellaneous utensils	100.00	
Silver and China	500.00	680.25

Linen:

2 Doz. table clothes @ $4.50	$ 180.00	
Napkins and towels	31.00	
Sheets, pillow cases, and spreads	37.80	
Miscellaneous linen	56.50	305.30

Miscellaneous:

Bookcases	$ 15.00	
Books, pictures, and rugs	250.00	265.00

Improvements—

Improvements in Dining room	25.00

HEATING.

(From Professor Covell's Report)

Main Heating Plant:			
Fuel	$4,074.00		
Labor	810.00	4,884.00	
Waldo Hall:			
Fuel	$ 900.00		
Labor	180.00	1,080.00	
Shepard Hall:			
Fuel	$ 390.00		
Labor	180.00	570.00	
Agronomy Building:			
Fuel	$ 630.00		
Labor	180.00	810.00	
Armory for hot water:			
Fuel	$ 75.00		
Labor	100.00	175.00	
Pharmacy Building:			
Fuel	$ 187.00		
Labor	90.00	277.00	
Cauthorn Hall:			
Fuel	$ 500.00		
Labor	180.00	680.00	
Total for one year		$8,476.00	
Less amount for Waldo Hall, Cauthorn Hall, and Shepard Hall		2,330.00	
Net amount required for one year		$6,146.00	
Total amount for two years			$12,292.00

LIGHT AND POWER.

(From Professor Covell's Report)

Summary of light and power for two years:

Current for power	$3,110.00

Current for lighting	1,100.00	
Lamp renewals and repairs	200.00	4,410.00

GENERAL REPAIRS.

(From Mr. Jackson's Report)

Administration Building—

Repairing cement facing on outside of building	$ 10.00	
Five new window panes	10.00	
New floor in hallway, north end building, first floor	25.00	
New floor in two rooms, north end of building, first floor	60.00	
North end of building is spreading apart and should be tied with large bolts	100.00	
Patching steps and floor on second floor	50.00	
Painting woodwork and tinting walls in two south rooms, second floor	25.00	
Patching stairways and floor, third floor	37.00	
Painting woodwork and tinting walls, ceilings in hallways, and five rooms, third floor	70.00	
Painting tin roof	80.00	
New cement walk at south entrance to building	25.00	492.00

Agricultural Hall—

Repairing north and south ends of building where floors are settling	$ 50.00	
Painting and repairing roof	300.00	
Painting windows and outside doors	80.00	
Patching stairways and halls, second floor	15.00	
One new pane glass for exhibit case in Museum	10.00	
Painting woodwork, plastering, and tinting	20.00	
Repairing four windows	10.00	490.00

Mechanical Hall—

Cement repairing of outside walls and front steps	$ 8.00	
Two screen windows in wall	4.00	
Steps and platform for back entrance	30.00	
Two new front doors	25.00	
Eight new window glasses	15.00	
Repairing plaster throughout building	50.00	

Painting and repairing roof	250.00	
Painting windows and outside doors	50.00	
Remodelling and improving toilets	750.00	
New floors in hallway, first floor	45.00	
Patching floor in Engineering laboratory	10.00	
New floor at head of stairway, second floor	18.00	
Painting ceiling Engineering laboratory	18.00	
Painting ceiling and one wall of old printing office	14.00	
One column in Electrical Engineering laboratory	10.00	
One new column in Physics lecture room	10.00	
One new door in Engineering laboratory	7.00	
Tinting hallways on first and second floors and along stairways	20.00	1,334.00

Armory Building—

Repairing stone walls where cement has been taken out	$ 3.00	
Two new outside basement doors	25.00	
Cement floor in hallway in basement entrance	15.00	
Four new inside doors	28.00	
New floors in basement	200.00	
Second floor new	400.00	
Replacing old toilets in basement	500.00	
Shower bath room enameled	20.00	
Repairing two stairways from second floor to gallery	25.00	
Front steps repaired	15.00	
Roof repaired and entire building given two coats of paint	600.00	
New water gutters	125.00	
Five window panes	5.00	2,203.00

Mining Building—

Painting entire building and repairing front basement door		$ 125.00

Power and Heating Plant—

Painting roof, doors, and windows of building	$ 25.00	
Renewal of steam and return pipes in first section of conduit and return pipes in second conduit	525.00	
Repairs to boilers (grate bars, and arch liners)	120.00	
Miscellaneous plumbing repairs	100.00	770.00

Mining Laboratory—			
Repairing roof		$ 35.00	
Cement facing on all outside walls needs new coat of cement (rain seeps through walls)		110.00	
Porch roof over front door to keep rain from beating in under door		20.00	
One new window cut through wall into furnace room		25.00	190.00
Pharmacy Building—			
Entire building given two coats of paint		$ 275.00	
Papering, tinting, and painting interior of building (patch work)		20.00	295.00
Cauthorn Hall—			
Patching floors		$ 45.00	
New walks in rear of building repaired		25.00	
Roof over back kitchen porch		25.00	
Basement doors and windows		30.00	
30 rooms to be papered and tinted		150.00	
New roof on cellar—shingled and painted		60.00	
Repairs to heating plant (old plant practically worn out)		500.00	
Rewiring entire building:			
Wiring, switches (for each floor and room), fuse box, flooring replaced, plaster replaced and painted	$ 540.00		
Ceiling rosettes, cord, socket, and lamps (for all rooms)	65.00		
Four fixtures for dining room (and two for reception room)	60.00	665.00	2,165.00
Mechanic Arts Building—			
Refitting windows and rehanging doors			30.00
Waldo Hall—			
Painting room and fire escapes		$ 400.00	
Slat window shades taken out and new cloth shades put in their place		400.00	
Floors finished		350.00	
Refitting windows and rehanging doors		30.00	
Repairs on water and drain pipes		200.00	1,380.00

Barns—

Painting old barn and hog house	$ 300.00	
Carpenter repair work around old barn	200.00	
Changing cupolas on old barn to agree with those on new barn	55.00	555.00

Horticultural Drying House—

New front porch	$ 20.00	
Painting entire building	75.00	
Chimney repaired	8.00	103.00

GENERAL IMPROVEMENTS.

Cauthorn Hall Sewer—

890 feet 8″ T. C. pipe at 24c	$ 213.00	
Freight on one car from Portland	33.80	
Drayage on pipe, cement, etc.	10.00	
Excavating and backfilling 354 yds. at 30c	106.20	
Flush tank complete	79.50	
Three manholes, complete	80.00	
Labor laying pipe	18.00	
Cement and sand not included in above	5.25	
Superintendence (12 days at $3.00 per day)	36.00	
Incidentals	40.00	622.35
Cost of connecting present plumbing to new sewer		50.00

Campus Drain Pipe—

Laying large drain pipe across campus and filling present ditch:		
770 feet 24″ pipe (@ $2.50 less 30 per cent)	$1,347.50	
Cement mixed	53.90	
Freight at $2.80 per ton	129.40	
Drayage at $1.00 per ton	46.00	
Cost of excavating and laying	205.00	
Cost of opening up the ditch below campus in order to get good out-fall	100.00	
Incidentals	100.00	1,981.80

Mechanic Arts Building—

New porch extending in front of both doors entering woodwork machine room	$ 20.00	

New over-head floor in woodwork class room, or in old carpenter room, in order to get more room for lumber supply	40.00	
Wire screens for 12 windows in front of lathes and machines in woodwork department	30.00	90.00

Barns—

Completing new barn ceiling, interior hard oiling, cement floor in root cellar, and partition in seed room	1,800.00

Farm—

New fence for entire farm	2,000.00

Fire Protection—

3 Hose carts @ $120	$ 360.00	
1500 feet Keystone hose @ 90c	1,350.00	
6 Underwriter's play nozzles @ $9	54.00	
100 Galvanized iron fire buckets @ $1	100.00	
Ladders for principal buildings	136.00	
10 Hydrants @ $45	450.00	
6 Split T's (6") @ $10	60.00	
3 L's (4") @ $2.25	6.75	
4 T's (4") @ $3.50	14.00	
1725 feet wood pipe (4")	431.25	
800 feet wood pipe (6")	240.00	
Labor, superintendence, drayage, etc.	250.00	3,451.00

EXPERIMENT STATION.

Additional Assistance—

Assistant in Dairy Husbandry to co-operate with dairymen of the State in an investigation of milk solids, testing and the manufacture of special classes of cheese, and expenses of operating dairy	$2,000.00	
Assistant in Agricultural Chemistry	1,500.00	
Field assistant for plant breeding in department of Agronomy	1,500.00	
Field assistant for co-operative work in the departments of Horticulture and Entomology	1,500.00	6,500.00

Land—

100 acres additional farm land	$20,000.00	
Land for Horticultural department	7,000.00	27,000.00

Supplies—

Chemicals and other supplies for work in Agricultural Chemistry		500.00

SUMMARY.

Maintenance—(Two Years)—

Additional professors, instructors, and assistants, including Industrial Pedagogy, Veterinary Science, Irrigation and Drainage, and Highway Engineering		$95,550.00
Repairs:		
Departmental	$ 3,564.00	
General	10,132.00	13,696.00
Supplies:		
Departmental (The student laboratory and shop fees cover the cost of departmental supplies)	23,848.00	
Miscellaneous (including stock for printing plant)		8,055.00
Heat (Less Cauthorn, Waldo, and Shepard Halls)	$12,292.00	
Light and Power	4,410.00	
Campus (Including labor and supplies for maintenance of greenhouses)	6,540.00	
Janitorial work (excluding salary head janitor)	7,700.00	
Furniture (Including recitation chairs, etc.)	2,000.00	
College Exhibits at state and other agricultural fairs	1,685.00	
Nightwatchman	1,200.00	
Printing and Advertising	4,800.00	
Telephone, telegraph, water tax	3,200.00	
Assistance in Registrar's Office, Business Office, and postage and stationery; traveling expenses (departmental and general)	6,430.00	
Contingent	5,000.00	55,257.00

Books:		
Library		12,451.00
Improvements—		
General	$ 9,995.00	
Miscellaneous	3,829.00	13,824.00
Equipment—		
Departmental	$80,614.00	
Miscellaneous	9,208.00	89,822.00

For Experiment Station summary, see preceding page.

SALARY LISTS.

Below are given lists of employees of the Oregon Agricultural College, with salaries, for the years 1906-1907, 1907-1908, and 1908-1909, showing the division of salaries between college and station funds. These totals, in some few cases, are more than amount actually received—due to resignation or the fact that some instructors may have been employed for only ten months of the year.

OFFICERS OF ADMINISTRATION AND INSTRUCTION DURING YEAR 1906-1907.

	Salary.		
Name and Official Position.	*Station.*	*College.*	*Total.*
THOMAS M. GATCH, A. M., Ph. D., President	....	$3,000	$3,000
JAMES WITHYCOMBE, M. Agr., Director of Experiment Station, Professor of Agriculture	$ 300	1,700	2,000
FREDERICK BERCHTOLD, A. M., Professor of English Literature	....	1,600	1,600
MARGARET COMSTOCK SNELL, M. D., Professor of Household Science	....	1,200	1,200
GRANT ADELBERT COVELL, M. E., Professor of Mechanics and Mechanical Engineering	....	1,600	1,600

John B. Horner, A. M., Litt. D., Registrar, Professor of History and Latin		1,600	1,600
Gordon Vernon Skelton, C. E., Professor of Mathematics, Civil and Mining Engineering		1,600	1,600
Arthur Burton Cordley, M. S., Professor of Zoology and Entomology	1,600		1,600
Edward Ralph Lake, M. S., Professor of Botany and Forestry	540	1,060	1,600
Abraham Lincoln Knisley, M. S., Professor of Chemistry	1,700		1,700
Helen Virginia Crawford, B. S., Professor of Elocution		1,000	1,000
George Coote, Prof. of Floriculture and Gardening	300	780	1,080
John Fulton, B. Agr., B. S., Professor of Mineralogy and Geology		1,400	1,400
Thomas Henry Crawford, A. M., Professor of Commerce	600	900	1,500
Claude Isaac Lewis, B. S., Professor of Horticulture	1,600		1,600
Ida Burnett Callahan, B. S., Dean of Women and Assistant Professor of English		1,000	1,000
Fred Leroy Kent, B. Agr., Associate Professor of Agriculture and Dairying	1,040	360	1,400
Charles Leslie Johnson, B. S., Assistant Professor of Mathematics		1,020	1,020
Emile Francis Pernot, M. S., Professor of Bacteriology	1,360	240	1,600
Clarence Melville McKellips, Ph. C., Assistant Professor of Pharmacy		1,400	1,400
Frank Edwards, B. M. E., M. S., Commandant, Instructor in Chemistry	300	900	1,200
William Thomas Shaw, B. Agr., M. S., Instructor in Biology		1,200	1,200
John Colburn Bridwell, B. S., Instructor in Biology		1,200	1,200
Mark Clyde Phillips, B. M. E., Instructor in Mechanical Drawing and Ironwork		1,020	1,020
Farley D. McLouth, B. S., Director of Art Department		900	900
Helen Lucile Holgate, B. S., Instructor in Stenography and Type.		540	540
Mark Dow McAllister, B. S., Instructor in Woodwork		900	900

Charles Edward Bradley, M. S., Instructor in Chemistry	1,080	....	1,080
Gerard Taillandier, Director of Music, Instructor of German	....	540	540
Nicholas Tartar, B. S., Instructor of Mathematics	....	780	780
Mary E. Sutherland, B. S., Instructor in Dressmaking	....	360	360
William O. Trine, Physical Director	....	1,020	1,020
Harry Beard, B. S., Band Master, Assistant in English	....	780	780
Loren Burton Baldwin, A. M., Instructor in English	....	600	600
Earle Vincent Hawley, B. S., Assistant in Mechanical and Electrical Engineering	....	840	840
Grace Gatch, A. B., Assistant in Latin and History	....	600	600
Juanita Rosendorf, B. S., Assistant in Typewriting and Stenography	....	540	540
Richard Jeffrey Nichols, B. S., Librarian	....	720	720
Edna Sheehy, Instructor in Vocal Music (Depends upon fees received from students)			
William McCauley Porter, Instructor in Blacksmithing	....	660	660
Frank McReynolds, Instructor in Stringed Instruments.. (Depends upon fees received from students)			
Bert Gilbert Hartson, Assistant in Physical Education	....	1,200	1,200
George B. Keady, Printer	360	840	1,200
Arthur W. Keady, Assistant Printer	300	480	780
Walter James Kent, Foreman Farm	600	....	600
John Anderson Spangler, Foreman Heating and Power Plant..	60	600	660
Ellsworth Erwin, Head Janitor	....	1,000	1,000
Robert Clement Wills, Carpenter	....	900	900
William Wicks, M. S., Assistant in Horticulture	720	....	720

Arthur George Bouquet, B. S., Assistant in Floriculture	540	....	540
	$13,000	$30,580	$43,580

OFFICERS OF ADMINISTRATION AND INSTRUCTION DURING YEAR 1907-1908.

	Salary.		
Name and Official Position.	*Station.*	*College.*	*Total.*
William Jasper Kerr, D. Sc., President	....	$5,000	$5,000
Thomas Milton Gatch, A. M., Ph. D., Prof. of Political and Mental Science	....	1,700	1,700
James Withycombe, M. Agr., Director of Experiment Station, Professor of Animal Husbandry	$1,700	300	2,000
Frederick Berchtold, A. M., Professor of English Language and Literature	....	1,600	1,600
Margaret Comstock Snell, M. D., Professor of Household Science and Hygiene	....	1,200	1,200
Grant Adelbert Covell, M. E., Professor of Mechanical Engineering	....	1,600	1,600
John B. Horner, A. M., Litt. D., Registrar, Professor of History and Latin	....	1,600	1,600
Gordon Vernon Skelton, C. E., Professor of Civil Engineering	....	1,600	1,600
Arthur Burton Cordley, M. S., Prof. of Zoology and Entomology	1,500	200	1,700
Edward Ralph Lake, M. S., Professor of Botany and Forestry	....	1,600	1,600
Abraham Lincoln Knisley, M. S., Professor of Agricultural Chemistry	1,800	....	1,800
Helen Virginia Crawford, B. S., Professor of Elocution	....	1,000	1,000
George Coote, Prof. of Floriculture and Gardening	200	800	1,000
John Fulton, B. Agr., B. S., Professor of Chemistry	....	1,600	1,600
Thomas Henry Crawford, A. M., Professor of Commerce, Clerk and Purchasing Agent	600	900	1,500
Claude Isaac Lewis, B. S., Professor of Horticulture	1,275	425	1,700

Ida Burnett Callahan, B. S., Dean of Women and Assistant Professor of English	....	1,000	1,000
Fred Leroy Kent, B. Agr., Professor of Dairy Husbandry	1,100	300	1,400
Charles Leslie Johnson, B. S., Professor of Mathematics	....	1,200	1,200
Emile Francis Pernot, M. S., Professor of Bacteriology	1,500	200	1,700
Clarence Melville McKellips, Ph. C., Professor of Pharmacy	....	1,400	1,400
U. G. McAlexander, Capt., 13th Inf., U. S. A., Commandant, Prof. Military Science and Tactics	....	600	600
James Dryden, Professor of Poultry Husbandry	600	1,200	1,800
Thomas Mooney Gardner, M. M. E., Professor of Electrical Engineering	....	1,800	1,800
Henry Martin Parks, B. S., E. M., Professor of Mining Engineering	....	2,000	2,000
Henry Desborough Scudder, B. S., Professor of Agronomy	600	900	1,500
Gerard Taillandier, Professor of Modern Languages, Director of School of Music	....	840	840
John Colburn Bridwell, B. S., Instructor in Zoology	....	1,200	1,200
Mark Clyde Phillips, B. M. E., Instructor in Mechanical Drawing and Ironwork	....	1,200	1,200
Farley D. McLouth, B. S., Director of Art Department	....	900	900
Helen Lucile Holgate, B. S., Instructor in Stenography and Typewriting	450	225	675
Mark Dow McAllister, B. S., Instructor in Woodwork	....	900	900
Charles Edward Bradley, M. S., Instructor in Chemistry	1,080	....	1,080
Nicholas Tartar, B. S., Instructor of Mathematics	....	900	900
Mary Elizabeth Sutherland, B. S., Instructor in Dressmaking	....	480	480
Harry Beard, B. S., Instructor in Mathematics	....	900	900
Loren Burton Baldwin, A. M., Instructor in English	....	900	900
William Authur Jensen, Secretary to the President	....	1,200	1,200

Charles Arthur Cole, M. S., Instructor in Horticulture	900	100	1,000
Grace Gatch, A. B., Instructor in History and Latin	....	600	600
Roy E. Heater, Instructor in Physical Culture	....	900	900
Herman V. Tartar, B. S., Instructor in Chemistry	....	900	900
Elmer Polic Jackson, B. S., Instructor in Woodwork	....	1,200	1,200
Earl Vincent Hawley, B. S., Instructor in Physics	....	700	700
Juanita Rosendorf, B. S., Assistant Registrar	....	525	525
Richard Jeffrey Nichols, B. S., Librarian	200	400	600
William McCauley Porter, Instructor in Blacksmithing	....	550	550
E. L. Adams, Instructor in English	....	350	350
Arthur George Bouquet, B. S., Assistant in Horticulture	....	540	540
	$12,605	$49,115	$61,720

OTHER OFFICERS.

George B. Keady, Foreman Printing Plant	$ 480	$ 720	$1,200
Arthur W. Keady, Assistant Printer	360	420	780
John Anderson Spangler, Foreman Heating and Power Plant	60	640	700
Ellsworth Erwin, Head Janitor	420	580	1,000
A. Applewhite, Farm Foreman	720	....	720
	$2,040	$2,360	$4,400

OFFICERS OF ADMINISTRATION AND INSTRUCTION DURING YEAR 1908-1909.

	Salary.		
Name and Official Position.	*Station.*	*College.*	*Total.*
William Jasper Kerr, D. Sc., President	....	$5,000	$5,000
James Withycombe, M. Agr., Director of Experiment Station, Professor of Animal Husbandry	$1,300	700	2,000

Arthur Burton Cordley, M. S., Dean School of Agriculture, Prof. of Zoology and Entomology......	800	1,000	1,800
Grant Adelbert Covell, M. E., Dean School of Engineering and Mechanic Arts, Professor of Mechanical Engineering	....	1,800	1,800
Juliet Greer, A. B., Dean School of Domestic Science and Art, Professor of Domestic Science............	....	2,000	2,000
John Andrew Bexell, A. M., Dean School of Commerce, Professor of Business Administration, Financial Secretary	....	2,000	2,000
Frederick Berchtold, A. M., Professor of English Language and Literature	....	1,600	1,600
John B. Horner, A. M., Litt. D., Prof. of History and Political Science, Registrar	....	1,600	1,600
Gordon Vernon Skelton, C. E., Professor of Civil Engineering	....	1,700	1,700
Edward Ralph Lake, M. S., Professor of Forestry and Botany....	....	1,700	1,700
George Coote, Professor of Floriculture and Gardening (On leave of absence)........			
John Fulton, M. S., Professor of General and Analytical Chemistry	....	1,700	1,700
Thomas Henry Crawford, A. M., Professor of Commercial Law............	....	1,500	1,500
Claude Isaac Lewis, M. S. A., Professor of Horticulture....................	1,100	700	1,800
Fred Leroy Kent, B. Agr., Professor of Dairy Husbandry..........	1,000	400	1,400
Charles Leslie Johnson, B. S., Professor of Mathematics..................	....	1,500	1,500
Emile Francis Pernot, M. S., Professor of Bacteriology	1,400	300	1,700
Clarence Melville McKellips, Ph. C., Professor of Pharmacy	....	1,500	1,500
Gerard Taillandier, Professor of Modern Languages........	....	1,600	1,600
U. G. McAlexander, Capt., 13th Inf., U. S. A., Commandant, Prof. Military Science and Tactics....	....	900	900
James Dryden, Professor of Poultry Husbandry........	1,000	800	1,800

Henry Desborough Scudder, B. S., Professor of Agronomy	850	850	1,700
Henry Martin Parks, B. S., E. M., Professor of Mining Engineering	....	2,000	2,000
Charles Edward Bradley, M. S., Professor of Agricultural Chemistry	1,500	....	1,500
Emmett Dunn Angell, Director of the Gymnasium, Professor of Physical Education	....	1,800	1,800
William Frederick Gaskins, B. S., Professor of Music (Depends on fees received from students for salary)			
William Arthur Jensen, Recorder of the Faculties, Secretary of the President	....	1,400	1,400
Ida Burnett Callahan, B. S., Assistant Professor of English Language and Literature	....	1,100	1,100
Farley D. McLouth, B. S., Assistant Professor of Art	....	1,200	1,200
Mark Clyde Phillips, B. M. E., Assistant Professor of Mechanical Engineering	....	1,350	1,350
Ida Angeline Kidder, A. B., Librarian	200	800	1,000
Nicholas Tartar, B. S., Instructor of Mathematics	....	1,000	1,000
John Colburn Bridwell, B. S., Instructor in Zoology and Entomology	300	900	1,200
Harry L. Beard, B. S., Director of Cadet Band, Instructor in Mathematics	....	1,000	1,000
Loren Burton Baldwin, A. M., Instructor in English	....	1,000	1,000
Earl Vincent Hawley, B. S., Instructor in Electrical Engineering	....	800	800
Grace Gatch, A. B., Instructor in History and Latin	....	800	800
William McCauley Porter, Instructor in Forging	....	720	720
Charles Arthur Cole, M. S., Instructor in Horticulture	600	400	1,000
Herman V. Tartar, B. S., Instructor in Chemistry	....	1,000	1,000
Elmer Polic Jackson, B. S., Instructor in Carpentry	....	1,350	1,350
Roy E. Heater, Instructor in Physical Education	....	900	900
Marion Suddum Van Liew, Instructor in Domestic Science	....	1,000	1,000

Ariel M. Ewing, Instructor in Domestic Art	....	1,000	1,000
Helen Hyde Tobin, Instructor in Domestic Art	....	1,200	1,200
Erwin L. Potter, B. S., Instructor in Animal Husbandry	400	600	1,000
C. L. Knopf, M. E., Instructor in Mechanical Engineering	....	1,000	1,000
Ralph D. Hetzel, A. B., LL. B., Instructor in Public Speaking and Debating	....	1,200	1,200
Winifred Maude Williams, B. Ph., Instructor in English and Physical Culture for Women	....	1,100	1,100
Edward B. Beaty, B. S., Instructor in Mathematics	....	900	900
Willibald Weniger, Ph. D., Instructor in Physics	....	1,200	1,200
Simon N. Caceres, C. E., Instructor in Spanish and Mathematics	....	1,000	1,000
H. Lew Mathre, Instructor in Commerce	....	900	900
Arthur L. Peck, B. S., Instructor in Floriculture and Landscape Gardening	....	1,400	1,400
George Robert Hyslop, B. Sc., Instructor in Agronomy	500	700	1,200
Earl Paul Harding, B. S., Instructor in Pharmacy and Chemistry	....	800	800
Genevieve Baum-Gaskins, Instructor in Music (Depends on fees for salary)			
Adma Green, Instructor in Art	....	800	800
Ezra S. Dixon, Instructor in English	....	550	550
William R. Boone, Instructor in Piano (Depends upon fees received from students)			
Nettie M. Flinn, Instructor in Mandolin, Piano and Violin (Depends upon fees received from students)			
Arthur George Bouquet, B. S., Assistant in Horticulture (On leave of absence)			
Ralph Wilmer Allen, B. S. Assistant in Horticulture	720	....	720

CLARENCE CORNELIUS VINCENT, B. S., Assistant in Horticulture	720	....	720
FRED CLARK EWING, B. S., Assistant in Entomology	720	....	720
CLAUDE CLIFTON CATE, B. S., Assistant in Plant Pathology	720	....	720
OTTO GERALD SIMPSON, B. S., Assistant in Dairy Husbandry	....	400	400
FRED L. GRIFFIN, B. S., Assistant in Zoology and Entomology	300	300	600
LAURA HILL, B. S., Assistant in Zoology and Entomology	200	280	480
SAMUEL HERMAN GRAF, B. S., Assistant in Mechanical Engineering	....	300	300
WILFORD W. GARDENER, C. E., Assistant in Civil Engineering	....	300	300
HERBERT EDWARD COOKE, B. E., Assistant in Mining Engineering	....	600	600
BENTON KIRKWOOD BRODIE, B. S., Assistant in Chemistry	....	250	250
HELEN MARGARET GILKEY, B. S., Assistant in Botany	....	200	200
GLEN DEHAVEN, B. S., Assistant in Bacteriology	300	....	300
FRANCES HUSTON, Assistant in Physical Education for Women	....	150	150
	$14,630	$68,500	$83,130

OTHER OFFICERS AND EMPLOYEES.

A. APPLEWHITE, Foreman of College Farm	$ 720.00	....	$ 720.00
GEORGE B. KEADY, Foreman of Printing Plant	....	$1,200.00	1,200.00
HELEN LUCILE HOLGATE, B. S., Station Clerk and Stenographer	825.00	....	825.00
JUANITA ROSENDORF, B. S., Assistant Registrar	....	757.50	757.50
JOHN ANDERSON SPANGLER, Foreman Heating and Power Plant	60.00	740.00	800.00
ELLSWORTH ERWIN, Head Janitor	....	1,000.00	1,000.00
W. HORACE KERR, Clerk Business Office	300.00	600.00	900.00
ARTHUR W. KEADY, Assistant Printer	400.00	600.00	1,000.00
	$2,305.00	$4,897.50	$7,202.50

TREASURER'S REPORT, 1907.

Corvallis, Oregon, July 17, 1907.

To the Honorable the Board of Regents,
Oregon Agricultural College.

Gentlemen:—Herewith I submit my report for the year ended June 30, 1907. The vouchers and other evidences of payment are on file in the office of the Clerk and Purchasing Agent.

Very respectfully,
B. F. IRVINE,
Treasurer.

BALANCES ON HAND JULY 1, 1906.

State Interest	$ 464.86	
Improvement	479.28	
Local Station	399.89	
Laboratory	1.955.64	
Special	1,346.84	$ 4,646.51

INCOME FOR THE YEAR.

Station	$ 15,000.00	
College	25,000.00	
State Interest	11,299.76	
Improvement	854.84	
Local Station	1.939.68	
Laboratory	3,917.50	
Special	25,000.00	
Adams	7,000.00	$ 90,011.78
Total to be accounted for		$ 94,658.29

DISBURSEMENTS.

Station	$ 15,000.00	
College	25,000.00	
State Interest	11,764.62	
Improvement	1,320.36	
Local Station	2,314.10	
Laboratory	3,601.22	
Special	23,338.65	
Adams	7,000.00	$ 89,338.95
Balance		$ 5,319.34

BALANCE BY FUNDS.

Improvement	$ 13.76	
Local Station	25.47	
Laboratory	2,271.92	
Special	3,008.19	$ 5,319.34

MISCELLANEOUS RECEIPTS (Included above).

Source.	*Amount.*	*Local Station.*	*Impov.*
Agriculture	$ 1,153.20	$ 1,153.20	
Dairy	776.48	776.48	
Horticulture	10.00	10.00	
Miscellaneuos	854.84	....	854.84
Totals	$ 2,794.52	$ 1,939.68	$ 854.84

1906-1907.

DISBURSEMENTS BY SALARIES-INCIDENTALS AND TOTALS.

Item.	*Salaries.*	*Incidentals.*	*Totals.*
Printing	$ 1,879.80	$ 1,954.55	$ 3,834.35
Agriculture	3,320.05	4,327.97	7,648.02
Horticulture—Coote	1,080.00	3,128.83	4,208.83
Botany	1,600.00	467.86	2.067.86
Chemistry	3,620.20	4,133.11	7,753.31
Bacteriology	1,600.00	77.78	1,677.78
Entomology	2,595.20	2,240.03	4,835.23
Mechanics	5,032.50	1,711.46	6,743.96
Household economy	1,560.00	116.87	1,676.87
Pharmacy	1,320.05	458.90	1,778.95
Library	600.00	706.91	1,306.91
Horticulture—Lewis	1,600.00	1,782.25	3,382.25
Mining	1,985.00	257.73	2,242.73
Salaries outside departments	18,924.85	....	18,924.85
Sanitary	....	211.00	211.00
Furniture	....	1,587.50	1,587.50
Traveling expenses	....	1,349.89	1,349.89
Advertising	....	99.33	99.33
Fuel	....	2,535.70	2,535.70
Postage	....	441.10	441.10
Freight	....	780.69	780.69
Telephones and telegrams	....	268.48	268.48
Scientific appratus	....	1,422.04	1,422.04
Tools and machinery	....	1,461.47	1,461.47
Building, general repairs	....	1,410.76	1,410.76
Building, repairs Station	....	97.85	97.85
Miscellaneous labor	....	696.40	696.40
Miscellaneous supplies	....	613.30	613.30
Extra janitors	....	1,030.23	1,030.23
J. A. Spangler	....	655.00	655.00
R. C. Wills	....	900.00	900.00
E. P. Erwin	....	879.90	879.90
Military	....	299.12	299.12
Vacation tour, Cordley and Shaw	....	136.70	136.70
Cauthorn Hall	....	441.78	441.78
Miscellaneous and current	....	2,825.35	2,825.35
Alpha Hall	....	36.75	36.75
Livestock	....	752.20	752.20
Building, new, Adams	....	324.51	324.51
Totals	$ 46,717.65	$ 42,621.30	$ 89,338.95

REPORT OF FINANCE COMMITTEE.

Corvallis, Oregon, July 17, 1907.

To the Honorable, the Board of Regents of the
Oregon Agricultural College.

Gentlemen:—We, your Finance Committee, would respectfully report that we have examined the books and vouchers in the office of Clerk and Purchasing Agent of the College and Station and find the same well kept, neat and correct.

We find that the balances on hand July 1, 1906, to be accounted for by the Treasurer were as follows:

State Interest	$ 464.86	
Improvement Fund	479.28	
Local Station Fund	399.89	
Laboratory Fund	1,955.64	
Special Fund	1,346.84	$ 4,646.51

We find the revenue for the year to have been:

Station—Hatch Act	$ 15,000.00		
Adams Act	7,000.00		$ 22,000.00
College—Morrill Act	$ 25,000.00		
State Interest	11,299.76		
Improvement Fund	854.84		
Local Station	1,939.68		
Laboratory	3,917.50		
Special	25,000.00	$ 68,011.78	$ 68,011.78
Total Amt. to be acctd. for			$ 94,658.29

We find the disbursements to have been:

Station—Hatch	$ 15,000.00		
Adams Act	7,000.00	$ 22,000.00	
College—Morrill Act	$ 25,000.00		
State Interest Fund	11,764.62		
Improvement Fund	1,320.36		
Local Station Fund	2,314.10		
Laboratory Fund	3,601.22		
Special Fund—1901	23,338.65	$ 67,338.95	$ 89,338.95
Balance on hand			$ 5,319.34

BALANCE BY FUNDS.

Improvement Fund	$ 13.76	
Local Station Fund	25.47	
Laboratory Fund	2,271.92	
Special Fund—1901	3,008.19	$ 5,319.34

Finance Report.

We have examined the report of the Treasurer of the Board for the year ended June 30, 1907, and find it correct as to the amount of money accounted for, namely, $94,658.29.

There is nothing in the reports either of the Treasurer of the Board or the Clerk of the College to disclose the amount that has been received or expended of the Institute Fund or the Building Fund.

We have checked up the drafts and receipted bills on file and find them correct as set forth in the report of the Clerk and Treasurer except the following:—No. 143, G. E. Stechert & Co., $14.16; No. 131, S. A. Brown, $8.25; No. 544, Forest McGinnis, $6.00; No. 545, Jesse Robinetts, $4.50. These are in transit and as soon as returned will be placed on file.

We would respectfully report that we estimate the income for the ensuing year as follows, in addition to the balances shown:

Morrill Act	$20,000.00	
State Interest (estimated)	10,000.00	
Special—Acts 1901 and 1907	37,500.00	
Local Station Fund—Farm (estimated)	2,500.00	
Hatch and Adams	24,000.00	$104,000.00

Out of the above amount will have to be paid the appropriation made by the Board to aid in the construction of the woman's building, amounting to $10,000.00.

In addition to the above amounts there was an appropriation for the betterment of the College and Station of $125,000.00—$65,000 of which is available this year and $60,000 that can be expended next year.

All of which is respectfully submitted,

J. T. APPERSON,
CLARA H. WALDO,
AUSTIN T. BUXTON,
Finance Committee.

TREASURER'S REPORT, 1908.

Corvallis, Oregon, July 15, 1908.

To the Honorable Board of Regents,
Oregon Agricultural College.

Gentlemen:—Herewith I submit my report for the year ended June 30, 1908. The vouchers and other evidences of payment are on file in the office of the Clerk and Purchasing Agent.

Very respectfully,
B. F. IRVINE,
Treasurer.

FINANCIAL STATEMENT—ACCOMPANYING TREASURER'S REPORT.

YEAR ENDED JUNE 30, 1908.

STATION FUNDS.

Balance on hand July 1, 1907—Local Station..		$ 25.47
INCOME.		
Hatch	$ 15,000.00	
Adams	9,000.00	
Local Station	2,584.48	$ 26,584.48
Total		$ 26,609.95
DISBURSEMENTS.		
Hatch	$ 15,000.00	
Adams	9,000.00	
Local Station	2,564.37	$ 26,564.37
Balance		$ 45.58

BALANCE BY FUNDS.

Local Station	$ 45.58

COLLEGE FUNDS.

Balance on hand July 1, 1907:		
Improvement	$ 13.76	
Special	3,008.19	
Laboratory	2,271.92	$ 5,293.87

INCOME.

Morrill	$ 30,000.00	
State Interest	11,350.67	
Improvement	629.70	
Special	43,750.00	
Laboratory	4,617.40	$ 90,347.77
Total		$ 95,641.64

DISBURSEMENTS.

Morrill	$ 30,000.00	
State Interest	10,643.53	
Improvement	527.12	
Special	46,703.37	
Laboratory	6,889.32	$ 94,763.34
Balance		$ 878.30

BALANCE BY FUNDS (COLLEGE).

State Interest	$ 707.14	
Improvement	116.34	
Special	54.82	$ 878.30

BALANCES BY FUNDS (ALL FUNDS).

Station	$ 45.58	
College	878.30	$ 923.88

SUMMARY—ALL FUNDS.

Balance on hand July 1, 1907		$ 5,319.34	
INCOME.			
Station	$ 26,584.48		
College	90,347.77	$116,932.25	$122,251.59
DISBURSEMENTS.			
Station		$ 26,564.37	
College		94,763.34	$121,327.71
Total balance—All funds			$ 923.88

MISCELLANEOUS RECEIPTS, INCLUDED ABOVE, AND THEIR DISTRIBUTION.

Source.	*Amount.*	*Local Station.*	*Impvt.*	*Labrty.*
Agriculture	$ 969.76	$ 969.76	....	....
Dairy	1,125.32	1,125.32	....	....
Horticulture	489.40	489.40	....	....
Miscellaneous—Rents, etc	629.70	....	629.70	....
Miscellaneous—Diplomas.	420.00	....	....	420.00
Totals	$3,634.18	$2,584.48	$ 629.70	$ 420.00

COLLEGE FUNDS.

MORRILL, STATE INTEREST, SPECIAL, IMPROVEMENT, AND LABORATORY.

Departments.	*Labor.*	*Supplies.*	*Salaries.*	*Totals.*
Printing	$ 173.23	$ 1,380.94	$ 1,375.00	$ 3,929.17
Agriculture	489.00	107.09	441.85	1,037.94
Dairy	17.70	25.73	411.85	455.26

Horticulture—Coote...	2,589.88	158.15	700.10	3,448.13
Botany	103.20	350.91	1,600.00	2,054.11
Chemistry	527.90	2,177.08	2,350.00	5,054.98
Bacteriology	8.40	4.11	338.40	350.91
Entomology	117.40	278.41	1,417.10	1,812.91
Mechanics	798.71	2,335.61	5,870.05	9,004.37
House Economy......	56.59	222.75	1,680.00	1,959.34
Pharmacy	50.15	584.30	1,400.00	2,034.45
Library	31.20	110.47	420.00	561.67
Horticulture—Lewis...	99.18	78.30	406.25	583.73
Mining	18.50	171.73	1,500.05	1,700.28
Poultry	222.40	162.20	1,300.00	1,684.60
Agronomy	51.90	205.55	790.40	1,047.85
Salaries outside......	....	....	21,419.62	21,419.62
R. E. Heater.........	....	....	637.50	637.50
Ross Finley	....	....	68.75	68.75
P. C. Adams	....	....	411.76	411.76
Totals ....$	5,355.34	$ 9,363.33	$ 44,538.68	$ 59,257.35

MISCELLANEOUS.

Sanitary ....$	211.00	
Furniture	72.35	
Traveling expenses	1,954.21	
Advertising	740.45	
Fuel	2,009.65	
Insurance	240.04	
Postage	558.60	
Freight	766.49	
Telephones and telegrams	502.29	
Tools and machinery	155.50	
Building repairs—General	4,285.52	
Miscellaneous labor	994.22	
Miscellaneous supplies	1,076.56	
Janitors—Extra	1,734.94	
J. A. Spangler—Engineer...................	640.00	
R. C. Wills—Carpenter.....................	675.00	
E. P. Erwin—Head janitor..................	650.00	
Military—Including commandant	551.34	
Cauthorn Hall	128.10	
Waldo Hall—Including water and sewer......	2,391.68	
Miscellaneous and current..................	5,590.55	
Waldo Hall—Snook & Burggraf—Finals.......	9,577.50	$ 35,505.99
Totals		$ 94,763.34

STATION FUNDS.

HATCH, ADAMS, AND LOCAL STATION.

Departments.	*Labor.*	*Supplies.*	*Salaries.*	*Totals.*
Printing ....$	178.46	$ 819.03	$ 605.00	$ 1,602.49
Agriculture	1,508.68	1,325.74	1,558.15	4,392.57
Dairy	755.95	163.97	988.15	1,908.07
Horticulture—Coote...	140.18	5.38	199.90	345.46
Agronomy	323.55	133.96	459.60	917.11
Chemistry	695.20	9.56	2,040.00	2,744.76
Bacteriology	11.20	16.22	1,361.60	1,389.02
Entomology	1,435.10	317.28	1,483.10	3,235.48
Poultry	....	6.85	350.00	356.85
Library	....	1,136.48	180.00	1,316.48
Horticulture—Lewis...	2,638.04	530.72	1,352.20	4,520.96
T. H. Crawford......	....	....	550.00	550.00
H. L. Holgate........	....	....	470.00	470.00
Totals ....$	7,686.36	$ 4,465.19	$ 11,597.70	$ 23,749.25

MISCELLANEOUS.

Traveling expenses ....$	1,033.26
Freight	111.14
Scientific	484.86
Tools and machinery	149.32

Miscellaneous labor	171.42	
Miscellaneous supplies	40.10	
J. A. Spangler	60.00	
E. P. Erwin	350.00	
Miscellaneous and current	370.02	
Livestock	45.00	$ 2,815.12
Total		$ 26,564.37

EASTERN OREGON EXPERIMENT STATION.
YEAR ENDED JUNE 30, 1908.

Balance in bank at Union, June 30, 1907	$ 1,128.19	
Received from State appropriation, five quarterly payments	9,375.00	$ 10,503.19
Disbursements—11 months		$ 4,352.25
Balance May 31, 1908		$ 6,150.94

FARMERS' INSTITUTE FUND.

Amount of appropriation for the year 1908	$ 2,500.00
Claims for expenses have been presented and allowed	219.40
Balance available June 30, 1908	$ 2,280.60

APPROPRIATION OF 1907.

Appropriation		$ 65,000.00
Cattle barn cost	$ 15,614.90	
Mechanic arts building cost to date	42,314.80	
Miscellaneous equipment	6,842.47	$ 64,772.17
Balance in fund		$ 227.83

There is a balance due Mr. A. F. Peterson on contract the sum of $1,000.00, for which we have the architect's certificate. This leaves a deficit in the fund of $772.17, to be paid out of some other fund.

APPROPRIATION OF 1908.

Appropriation		$ 65,000.00
BILLS ALLOWED BY SECRETARY OF STATE.		
Equipment	$ 11,140.49	
Improvement	3,227.31	$ 14,367.80
Balance at date		$ 50,632.20

REPORT OF THE FINANCE COMMITTEE.

Corvallis, Oregon, July 15, 1908.

To the President and Members of the Board of Regents
of the State Agricultural College.

We, your Finance Committee, after having checked over the reports, vouchers and check books of the Accountant and Treasurer of the Board, would respectfully report as follows:

We find there are no vouchers on file in the State Interest Fund for check No. 3805, for $325.00;

In the College Fund for checks No. 1836, for $46.50; 1839, for $167.50;

In the Local Station Fund for checks No. 625, 627, 628, 630, 631, and 632;

In the Laboratory Fund, checks No. 230, 233, 234, 236 to 241 inclusive, No. 246, 251, 254, 258, 259, 261, 262, 263, 265, 267, 268, 272, 275, 278, 284, 288, 300, 302, and 303.

These checks were all drawn for the month of June and the vouchers have not yet been returned.

We find that there was a balance on hand to the credit of the Experiment Station at beginning of the year July 1, 1907, the sum of $25.47. The aggregate receipts during the year amount to $26,584.48. Total to be accounted for, $26,609.95.

We find that the aggregate disbursements on account of this fund during the year amounts to $26,564.37, leaving a balance in the Local Station Fund to the credit of this account of $45.58.

We find that there was a balance on hand to the credit of the College Account at the beginning of the year July 1, 1907, $5,293.87. The aggregate receipts during the year from all sources, account of this fund, amounts to $90,247.77, making total to be accounted for, $95,641.64. There has been expended during the year from this account the sum of $94,763.34, leaving a balance on hand at date to the credit of the different funds as follows:

State Interest	$ 707.14
Improvement	116.34
Special Maintenance	54.82
Making a total of	$ 878.30

We find from the accounts that there is due to the College from the Farmers' Institute Fund of the State of Oregon, for year ending December 31, 1908, the sum of $2,500.00. From this fund there has been drawn $219.40, leaving an unexpended balance of $2,280.60.

There was appropriated by the State Legislature at the session of 1907, for the College and Station, for the year ending December 31, 1907, the sum of $65,000. From this amount there has been constructed a cattle barn, at a cost of $15,614.90; a mechanics arts building costing $43,314.80; for miscellaneous equipment there has been expended $6,842.47; total, $65,772.37. This leaves a deficit to be provided for of $772.37.

There was appropriated by the State Legislature at the session of 1907, for the College and Station, for the year ending December 31, 1908, the sum of $65,000. There has been allowed and paid of this fund for equipment and improvement the sum of $14,367.80, leaving a balance on hand of $50,623.20. There are bills now pending, before the Secretary of State, against this fund amounting to $1,088.08.

There was appropriated by the State Legislature at the session of 1907, for the running expenses of the Eastern Oregon Experiment Station from January 1, 1907, to December 31, 1908, the sum of $15,000. As per account of the Treasurer of the Board, there has been drawn from this fund the sum of $11,250, leaving a balance still due from this appropriation in the hands of the Treasurer amounting to $3,750. It appears from the bank book of the Treasurer of the Board that there has been paid out of this fund, the sum of $6,229.01; according to his bank account, this would leave a balance on hand to the credit of this fund amounting to $5,020.99.

We find upon examination that the account of the Treasurer agrees with the accounts of the Clerk and Purchasing Agent of the College and Station, as to the amount of money received, and disbursements made.

Respectfully submitted,
J. T. APPERSON,
CLARA H. WALDO,
AUSTIN T. BUXTON,
Finance Committee.

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BIENNIAL REPORT

OF THE

BOARD OF REGENTS

1910-1912

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BIENNIAL REPORT

OF THE

BOARD OF REGENTS

1910-1912

AGRICULTURAL COLLEGE PRESS

Honorable Oswald West,

Governor of the State of Oregon.

Sir:—

In accordance with the law, I herewith submit the report of the Board of Regents of the Oregon State Agricultural College and Experiment Station for the biennial period ending December 31, 1912, including the report of the President of the College and the appended reports of the Treasurer, Director of the Experiment Station, and other officers. In these reports will be found detailed information regarding the work of the College and Station, lists of employes and their salaries, a statement of receipts and disbursements, and itemized estimates of requirements for the next biennium.

Respectfully,

J. K. WEATHERFORD,

President of the Board of Regents.

233049

OREGON AGRICULTURAL COLLEGE

PRESIDENT'S BIENNIAL REPORT

1910-1912

To the Board of Regents:

The President of the College has the honor to submit to the Board of Regents his report for the years 1910-11 and 1911-12, together with a statement of the condition of the institution and an estimate of the requirements for the next biennium. In previous reports the President considered, at considerable length, various questions relating to the function and field of the College, its policy, organization, and courses of study; and gave detailed information regarding student enrollment, the faculty, construction and improvement of buildings, etc. It would seem unnecessary that material contained in these reports should be repeated here. In this report reference is made to statistics already published only to the extent that they may be of immediate interest. For more detailed information, your attention is respectfully invited to the appended reports, and to official College publications, which are submitted as a part of this report. The appendices and reports include the following:

1. Reports of the Schools and Departments of Instruction.
2. The Report of the Director of College Extension.
3. The Report of the Librarian.
4. The Report of the Registrar.
5. The Report of the Director of the Experiment Station.
6. The Report of the Superintendent of Heating.
7. The Report of the Superintendent of Light and Power.

8. Financial Reports, including the Report of the College Treasurer.
9. Itemized Estimates of Requirements.
10. *The Annual Reports of the Director of the Experiment Station for the past two years.
11. *The Reports of the Branch Experiment Stations—
    - The Eastern Oregon Station, at Union.
    - The Umatilla Station, at Hermiston.
    - The Sherman County Dry-Farm Station, at Moro.
    - The Harney County Dry-Farm Station, at Burns.
    - The Southern Oregon Station, at Talent.
    - The Crook County Demonstration Farms, at Redmond and Metolius.
12. *The Report of the Crop and Fruit Pest Investigations.

Advancement.

The past two years have been marked by continued advancement and growth for the Agricultural College. There has been a marked improvement in the preparation of intrants; the student enrollment has greatly increased; the faculty has been enlarged and strengthened; a department of College Extension has been organized; courses of study have been revised and improved; requirements for admission have been increased, and the standard of work advanced; new buildings have been constructed; additional equipment provided, and many other improvements made—all of which have added to the thoroughness and efficiency of the work throughout the institution.

STUDENTS.

The number of students enrolled in the College in 1910-11 was 1,778; in 1911-12, 2,868. The table in the Registrar's report, giving the geographical classification of students, shows that in 1910-11 the attendance represented all the counties of Oregon, twenty-seven other states and territories, and nine foreign countries; in 1911-12, all the counties of Oregon but one, thirty-six other states, and eight foreign countries.

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*These reports are not included in this volume, but may be had under separate cover.

Enrollment Distribution.

Statistics showing the classification of students and their distribution among the different courses are given in the Registrar's report. These include all students doing work in residence at the College, but do not include correspondence students, or others enrolled in extension work, these being given in the report of the Director of Extension. The enrollment during the past biennium, omitting duplicates, may be summarized as follows:

	1910-11	1911-12
Regular matriculates	970	1142
Winter short courses	649	1583
Summer session	159	143
Totals	1778	2868

The registration for the present year is incomplete, as many students enter in January and at the opening of the second semester. The enrollment on December 21, in all courses, excluding duplicates, was 1,960, divided as follows: regular courses, 1,257; summer session, 98; agricultural short course, 605. These represent all the counties of Oregon, thirty-seven other states and territories, and nine foreign countries.

It will be observed that the largest percentage of increase has been in the short course work. The number of students pursuing the regular 36-week courses during the year 1911-12, however, was 24 per cent greater than during the preceding year, while the registration up to date for the present year in these courses indicates an increase during the biennium of 40 per cent.

Indications of Comparative Growth.

Such rapid growth in student enrollment is rarely paralleled in educational institutions. For instance: a recent report of the University of California shows that the attendance of students in the regular courses in that prosperous institution had increased but 15 per cent in two years; the President of Cornell University reports an increase for 1911-12 of only 4 per cent in the number of regularly matriculated students; i. e., excluding those in the summer session and in the winter short courses in agriculture; and Ohio State University, an increase for 1910-11 of only 5 per cent, including winter short courses.

The popularity of the winter short courses, and their value, is shown by the following record of enrollment in these courses:

1907-08	173
1908-09	225
1909-10	606
1910-11	716
1911-12	1603

Winter Short Courses.

An examination of educational statistics shows a rapidly increasing demand for this class of work generally throughout the country. The reports of the Director of the New York College of Agriculture, Cornell University, show an increase in the enrollment of students in the winter short courses of from 270 in 1907-08 to 451 in 1911-12. In Ohio State University the number of students in these courses in 1910-11 was 183; in the University of Missouri for the year 1911-12 the number was 305; in the University of California for 1912, 894; in the Iowa State College of Agriculture and Mechanic Arts for 1911, 594; in Michigan Agricultural College, 321; in Kansas Agricultural College, 474. At Purdue University the number of students in the winter short courses during the year 1910-11 aggregated 1,469, of this number "about 1,300 being in the farmers' short course of one week." The importance attached to this work is further shown by the fact that Missouri University asked the legislature for an appropriation of $20,000 a year to defray the expenses of the winter short courses.

Preparation of Intrants.

As reported elsewhere, there has been a notable improvement during recent years in the preparation of those who come to the Agricultural College from the high schools of the State. There has been a corresponding improvement in the work of the students. The heads of departments uniformly report that the students are much better prepared each year for their college work. Statistics compiled by the Registrar yield the following summary, which indicates the marked improvement in general scholarship throughout the institution during the past three years: The number of regularly matriculated students whose average was below the passing grade, in 1909-10, was 19 per cent; in 1910-11, 11 per cent; in 1911-12, 6 per cent. This great improvement is largely due to the improved facilities for the work, provided by the construction of new buildings, purchase of additional equipment, the more complete organization of the departments, and the employment of additional instructors. But the superior work of the high schools in which students receive their preparation for admission to the College has undoubtedly also been an important factor.

Student Government.

One of the most important questions with which every College has to contend, relates to student government. The more nearly conditions approach the ideal, the less time is required on the part of college officials in dealing with matters relating to the deportment of students. One of the old college traditions, not entirely outlived in modern times, is that the ordinary rules of conduct need not apply in institutions of higher learning; that even serious infractions of law, if committed by college students, should be condoned, being regarded merely as "college pranks." More and more, however, particularly in America, have educational leaders, and especially the people, come to feel that college training that does not cultivate a regard for the rights of others and respect for law and order, cannot be of greatest value in preparing young people for the duties of citizenship. Recognition of the power of initiative, moreover, and the willingness and ability to assume responsibility and to stand for the right, as fundamental prerequisites to success, give emphasis to the importance of taking advantage of the favorable conditions provided in college to develop in the students these sterling qualities. Instead of college students being granted undue freedom, therefore, their conduct should be more circumspect; they should, of their own volition, or under administrative compulsion, be exemplars of the highest ethical and social standards.

So much has been accomplished in this direction during recent decades that conduct accepted as a matter of course in college student life half a century ago, or even a quarter century ago, would not be tolerated at the present time in any reputable institution of higher learning. This is due in part to the closer contact of educational institutions with the people, but mainly to a difference in student ideals and the broader and stricter interpretation of the obligations and responsibilities of student life. Indeed, the improvement has been so great that in some institutions, at least, questions of student conduct have ceased to be of real concern to faculties and administrative officers, who, happily, have grown away from the days of enforced police service, in an attempt to maintain reasonable respectability in the college community, to a condition where they are free to devote their energies to service in the real work for which colleges are maintained. One of the greatest agencies in the achievement of this ideal, which should be more generally realized, is student self-government. This plan has been attempted in many institutions, and in a few is proving a real success.

Improvement in Student Deportment.

The plan of student self-government was adopted at the Oregon State Agricultural College in December, 1910, the students themselves taking the initiative. With the advice of College officers, student committees worked out the form of government and prepared the constitution and by-laws. The administration of student government is vested in a Student Council composed of 13 members—seven seniors, three juniors, two sophomores and one freshman. The function of the Council, under the authority of the President of the College, is "to make and enforce regulations and consider other matters pertaining to student discipline." In accepting the plan of self-government, the Student Body adopted the existing faculty rules relating to the more important matters affecting student conduct, including regulations against hazing, the use of intoxicating liquors, and the use of tobacco on the College campus. Although there were some misgivings at the time on the part of a few as to the outcome of the movement, it has been a marked success from the beginning. While the decisions of the Student Council require the approval of the President of the College, every recommendation of the Council, during the two years since the plan was inaugurated, has been approved without modification. The Council has had the general support of the Stu-

Student Government at Oregon Agricultural College.

dent Body. At no time has there been manifest any disposition on the part of its members to shrink from the responsibility of their position. They have made thorough investigation of the cases that have come before them, and have discharged their duties in a spirit of fairness, though with a determination strictly to enforce the Student Body regulations.

Penalties Imposed by Student Council.

Many minor matters relating to student deportment have been adjusted by the Council, but only 23 cases requiring formal action and the approval of the President, have been passed upon during the two years. Of these, 8 were students of the secondary courses, and 15 in the regular degree courses—2 freshmen, 8 sophomores, 2 juniors and 3 seniors. Of the 23 cases, 13 had violated the regulation prohibiting the use of intoxicating liquor; 6 had violated the regulation against hazing; and 4 had been convicted of theft. The penalties imposed by the Council varied according to the character of the offense and the circumstances attending the case, including formal reprimand by the President of the College, public confession and apology, probation, and suspension from the institution.* It will be observed that the total number of cases comprises less than seven-tenths of one per cent of the students in the regular 36-week courses; and, since there is no known case that has not been handled, this must be regarded as an exceptional record, a credit alike to the students, the Council and the institution.

Reports from the Registrar and the Secretary of the Y. M. C. A. show that a large proportion of the students of the Agricultural College are either wholly or partially earning their own way. Many of these secure employment at the College, doing office or janitorial work, assisting in the laboratories and shops, in the orchards and barns, on the farm, and in the dormitories, while others get positions in the city which require only part of their time. Some students who are entirely dependent upon their own efforts are able to take partial courses only, devoting one-half or three-fourths of their time to College work in order that they may have sufficient time to earn the amount required to keep up their expenses. As is true in other institutions, many of the very best students are among those who are largely or entirely self-dependent. Of these, there are a number each year who are unable to earn enough during the school year and through vacation periods to pay their expenses at College. Some of these have to omit a year or two in order to accumulate sufficient money to continue their work to completion. For this reason students not infrequently require as many as six or seven years to complete their courses. But there are a large number who are unable even to do this, and, notwithstanding the sacrifices they are willing to make to get an education, are compelled, for want of a small amount—perhaps $25 to $100—to withdraw permanently from the College before graduation.

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*Given in detail, the penalties were: Six students were reprimanded by the President of the College; 5 made public acknowledgment and apology; 4 were placed on probation; 6 were suspended from the institution for periods ranging from a few weeks to one year; and 2 were publicly reprimanded and fined $25 each, the fine being imposed to cover the cost of reward offered for the apprehension of the guilty parties.

Students Earn Their Own Way.

To assist such persons, many institutions have large student loan funds. Through the liberality of Hon. R. A. Booth, of Eugene, Oregon, a Student Loan Fund was established in the Oregon State Agricultural College in January, 1911. A report of this fund is given in the President's annual report for 1910-11. The condition of the fund and the use which is being made of it are given in the report of the Manager of the Business Office. From this report it appears that the loans are distributed among all classes of students. Since the fund was established, there have been 50 loans, ranging in amounts from $5 to $75. The largest number of loans was for $50, the average being $38. There are at present 22 loans outstanding, amounting in the aggregate to $870. The amount of the fund at present is $1,188.95. Much larger sums could be used to splendid advantage; in fact, the College needs a loan fund of at least $10,000. Such a fund would be the means of assisting hundreds of worthy young people in completing their education, to whom otherwise a college training, at least throughout the course, would be impossible. There is perhaps no other way in which the same amount of money could be used to better advantage.

Student Loan Fund.

Recognizing the real value of such assistance, and the inadequacy of the present College Loan Fund, Mr. Booth has recently offered to make further contribution of $500 to the fund, provided an additional $1,000 shall be raised within one year.

Larger Fund Needed.

It is hoped that the friends of the College will respond to this most worthy cause to the extent, at least, of meeting Mr. Booth's requirement, thereby increasing the fund by $1,500.

Graduates.

Complete lists of the graduating classes of the past two years will be found in the report of the Registrar. Summarized, these show that the class of 1911 numbered 129, 124 having completed the regular baccalaureate courses, while 4 received the Master's degree, and one received a certificate of graduation from the School of Music. In 1912, there were graduated 114, 112 with the Bachelor's degree and 2 with advanced degrees. In addition, 7 received certificates from the two-year course in Pharmacy, and 5 from the course in Music. The fact that the graduating class in the second year of the biennium is smaller than in the first is due to the advancement of the standard, in 1908, by adding the equivalent of one year's high school work to the requirements for admission to the regular degree courses. The Registrar's report shows a decrease in the number of graduates from all courses except Agriculture and Domestic Science and Art. The former had an increase of 20 per cent, and the latter, about 135 per cent. The increase in the number of engineering students during recent years, and hence in the number of engineering graduates, has not been so large as in other courses, particularly in Agriculture and Home Economics. As discussed elsewhere in this report, this is a condition generally true in the land-grant institutions throughout the entire country. It is accounted for on the simple theory of supply and demand. To the greater opportunities in scientific agriculture and the general awakening over the country to the importance of training for home life, and to the demand for teachers in Domestic Science in high schools, is due the popularity of agriculture and home economics courses, and the comparatively large increase in the number of students pursuing these courses.

FACULTY.

As given in the last annual report, the faculty for the year 1910-11, including those engaged in administrative, instructional, and research work, numbered 106. Of this number, 93 were engaged in instructional work and 9 were giving full time to research work in connection with the agricultural Experiment Station. The instructional force comprised 29 professors, 1 associate professor, 8 assistant professors, 46 instructors, and 9 assistants. Of these, 15 divided their time between instructional and research work, while 6 of the assistants were employed for part time only. The actual instructional force during that year was equivalent to the full time of 76 instructors.

Faculty Statistics.

During the year 1911-12, the faculty, including the Experiment Station staff and the superintendents of branch stations, numbered 134. Of this number, 86 gave all their time to instructional work, 22 gave their entire time to work of the Experiment Station, while 17 divided their time between instructional and research work. Of the instructional force there were 31 professors, 2 associate professors, 9 assistant professors, 52 instructors, and 9 assistants. Five of the assistants were employed for part time only. The actual instructional force during the year was equivalent to the full time of 90 instructors. The Experiment Station, or research, force was equivalent to the full time of 30 people.

Division of Work.

For the year 1912-13, following the same classification as given above, the faculty numbers 147. The instructional force is equivalent to the full time of 101, and the Experiment Station force, to 29. In the instructional force there are 32 professors, 3 associate professors, 14 assistant professors, 58 intructors, and 9 assistants. Four of the assistants are employed for part time only. The following divide their time between instructional and experimental work: 9 professors, 1 associate professor, 5 assistant professors, 4 instructors and 2 assistants. Twenty-one, including 5 superintendents of branch Experiment Stations, are giving their entire time to Experiment Station work. Excluding laborers, but including farm superintendents, clerks, and stenographers, the number of people engaged in Experiment Station work at the home station, branch stations, and in the field, is 52. The total number of people in the employ of the institution, excluding student janitors and other miscellaneous laborers employed by the hour, but including printers, clerks, and stenographers, regularly employed janitors, firemen and laborers, and farm, campus, greenhouse, and barn foremen, aggregates 189.

The large increase in the Experiment Station staff during the three years is due to the number of people employed at the branch Experiment Stations, and for research work under the acts passed by the last Legislative Assembly appropriating money for general scientific investigations and for special work in horticulture and crop and fruit pests.

Breadth of Faculty Training.

It is interesting to note the breadth of training represented in the faculty. Members of the faculty have attended as many as 111 different colleges and universities, including five institutions of Europe and two of Canada. They have received 135 bachelor's degrees, 17 normal certificates or diplomas, and 48 advanced degrees; while 22 have completed from one to two years' work towards advanced degrees, and 38 have attended summer sessions in different institutions throughout the country. A large number of the faculty have attended two or more colleges and universities. Of the total number in the faculty, 45 have attended the Oregon Agricultural College. Of these, 39 have received bachelor's degrees and 5 master's degrees, while 26 have also attended other colleges and universities. The six members who have attended the College, but have not received their degrees from this institution, have either graduated from other colleges and universities, or are now employed on part time as shop and laboratory assistants while completing the work required for graduation.

Exclusive of the Oregon Agricultural College, the number of representatives on the faculty from different colleges and universities varies from 1 to 17, the University of Chicago being represented by 17; Cornell University, 15; University of Illinois, 11; University of California, 10; Harvard University, 10; Iowa State College, 8; Columbia University, New York (including Teachers' College), 7; University of Wisconsin, 7; Kansas State Agricultural College, 6; Michigan Agricultural College, 6; Colorado Agricultural College, 3; University of Minnesota, 3; University of Michigan, 3; Massachusetts Agricultural College, 3; Ohio State University, 3; Purdue University, 3; Willamette University, 3; while different other colleges and universities have from one to two representatives each, including such institutions as Yale University, Johns Hopkins University, Stanford University, Indiana State University, University of Nebraska, Oklahoma Agricultural and Mechanical College, Utah Agricultural College, Wellesley College, West Point Military Academy, Massachusetts Institute of Technology, Sargent School of Physical Education, Brown University, Kansas State University, University of Virginia, University of Missouri, Western Reserve University, Univerisity of Oregon, University of Washington, Notre Dame University, Ontario Agricultural College, and the following European institutions: University of Strassburg, University of Halle, University of Berlin, University of Bazel, and the Switzerland Normal University.

Colleges and Universities Represented.

COURSES AND ORGANIZATION.

The general policy of the Oregon Agricultural College and the development of the courses of study in accordance therewith, have been discussed in former reports. As affecting this policy, and in approval thereof, reference may consistently be made, however, to the establishment, in 1909, by the State Legislature, of the Board of Higher Curricula, and to the orders issued by this board relating to the work of the College. The duty of the Board, as defined by law, is "to determine what courses of study or departments, if any, shall not be duplicated in the higher educational institutions of Oregon, and to determine and define the courses of studies and departments to be offered by each such institution." After having investigated the conditions at the educational institutions, the Board gave public hearings, as required by law, and on April 28, 1910, issued an order, the following provisions of which relate to the Agricultural College:

State Board of Higher Curricula.

"1. The departments of Mechanical Engineering and Mining Engineering shall be confined to the State Agricultural College.

"2. In view of the fact that strong departments in Civil Engineering and Electrical Engineering are now established in both the State Agricultural College and the University, these departments shall continue to be a part of both institutions.

"3. The School of Education, as such, shall be confined to the University of Oregon, but this rule shall not be construed against the maintenance by the State Agricultural College of a Department of Industrial Pedagogy, and the provision by this institution for such work in connection therewith, or related thereto, as may be necessary in training persons to teach industrial subjects in the common and high schools, in accordance with the provisions of the Nelson amendment of 1907 to the Morrill Act of 1890, and the interpretation thereof, and the instructions given in connection therewith, by the United States Department of the Interior.

Industrial Pedagogy.

* * *

"5. The course in Commerce in the State Agricultural College as described and defined in the current issue of the catalog of the State Agricultural College (1909-10) on pp. 90, 91 and pp. 165-169, shall be continued in the State Agricultural College.

"6. No new school, department, or course may be established in either the State Agricultural College or the University of Oregon until the plan of such school, department, or course shall have been submitted to this Board and have received its approval."

It will be noted that the orders of the Board of Higher Curricula required no change in the courses of study offered by the Agricultural College. It was recognized that the policy of this institution, in concentrating upon courses distinctive of the land-grant colleges, was not only in harmony with the provisions of law, but also with the conditions in Oregon as affecting the College and the interests of the State.

No Change Required in College Courses.

At a subsequent meeting, held on April 10, 1912, upon recommendation of the President of the College, with the approval of the Board of Regents, the work in Latin, by order of the Board of Higher Curricula, was discontinued in this institu-

Latin Discontinued at College.

tion. This subject had been prescribed in the course in Pharmacy, and was open as an elective to others, being taken more generally by students in Domestic Science and Art. An arrangement having been made by which Pharmacy students could get the required knowledge of Latin in a special course in nomenclature, the College authorities decided to discontinue Latin, considering that it was more properly a subject for the State University, and that other work would be of more value in the technical courses of the College.

College Standard Advanced.

At a meeting of the Board of Regents, held on November 30, 1912, the standard was advanced one year, thereby making the completion of three years' work in a standard high school, or its equivalent, a prerequisite for admission to the regular degree courses. In order that due notice may be given those who have been planning especially for entrance to the College on the present standard, and would be prepared to matriculate next September, it was decided that this change should go into effect one year later, or in September, 1914. This would also have the advantage of giving high schools now offering work through two years only, an opportunity to add another year, thereby affording the necessary additional training to their pupils who may desire to enter the College.

Entrance Requirements In 1908.

On January 16, 1908, similar action was taken by the Board, and the requirements for admission increased by an equivalent of one year's high school work. Conditions throughout the state were such at that time that it was not practicable to require more than two years' high school work, or its equivalent, for admission to the freshman classes, without removing the advantages of the institution beyond the reach of those who desired and most needed the training which it affords. Great advancement has been made, however, during the past four years in the development of the high schools of the state. During the past two years, particularly, there has been a large increase in the number of high schools, and most of those in the larger cities and towns, that had formerly been on the two or three year basis, have extended their work through four years. The improvement in this respect, in fact, as influencing the preparation of high school students entering the College, has been so marked that, after careful investigation, it was concluded that the time was opportune for another step in the advancement of the College standard. For instance, as late as 1909-10, 100 students entered the secondary courses of the College from the eighth grade of the public schools; in 1910-11, this number was reduced to 67; and in 1911-12, to 55, notwithstanding the fact that each year there was a large increase in student enrollment. On the other hand, the number who entered the College from the fourth year of high school has increased as follows: 1909-10, 67; 1910-11, 72; 1911-12, 139; and in 1912-13 (to November 26), 201. In this connection, an investigation of the Registrar's records yields significant information regarding the opportunity for high school preparation. Up to November 26 of the present year, those entering the College for the first time numbered 547. Of these, 53 entered from other colleges and universities, and 26 came from districts in which there were no high schools. Of the remaining 468, 438 came from districts in which high school work was given through four years, and 4 came from districts in which high school work was given through three years, while the remaining 26 came from districts in which there were no opportunities for high school work beyond the first or second year.

Improvement of Oregon High Schools.

It will be observed, therefore, that had the College been on the three-year standard, but 16 of those who entered would have required an additional year's high school work for admission to the degree courses, and these need not have been denied admission to the College if their purpose was to come to the institution for technical or industrial work that could not be had in their home towns; they could have entered the secondary industrial courses, as did the 36 who had completed only eighth or ninth grade work. The addition of another year's work to the requirements for matriculation will greatly strengthen the work in all courses throughout the institution. It will make possible a more thorough training in the basic scientific work, and will also leave

Advantages of Increased Entrance Requirements.

more time for the distinctive technical subjects in which the students major during the junior and senior years.

More Complete Organization of Courses.

Another important change during the past biennium has been made through the revision of the courses of study and a further extension and more complete organization of the work in a number of departments, particularly in Agricluture, Home Ecnomics, and Engineering. The great improvement in the preparation of students coming to the College, and the large increase in enrollment, has made possible a readjustment and strengthening of the courses in many important particulars. In the departments of Agriculture there has been a further segregation of subjects, thereby making possible narrower specialization, and insuring more thorough and efficient work. In Agronomy, the work is now organized under four divisions, there being a specialist in charge of each. These include irrigation and drainage, soils, farm crops, and farm mechanics. In Horticulture, there are the divisions of pomology, olericulture, floriculture, and landscape gardening. In Animal Husbandry, also, there are two principal divisions, breeds and breeding and stock judging. In Mining Engineering, students are now able to major in mining, in geology, in ceramics, or in industrial chemistry; and in Civil Engineering, in hydraulics, highways, structural engineering, and railroads. In Home Economics, the work is organized into the departments of Domestic Science and Domestic Art, and in each of these students may select their major in any one of a number of different subjects. There is the same tendency in other courses, as the number of students warrants a further extension and division of the work without adding to the relative cost. This whole plan is of the greatest importance to students, as it affords them an opportunity to specialize in the particular field in which they may have greatest interest.

In no other part of college work has there been greater relative development and improvement than in the short courses. These courses have been extended and developed, and the work classified, until they are on practically as sound a basis as is the work of the regular long courses. In some departments, also, this work is now planned on a progressive basis so that persons coming for the second year may continue in the more advanced work in the particular subjects in which they may be interested. This broadening of the winter short course work is in response to a demand from those who have already attended one or more sessions, and who desire opportunity for further specialization. In this connection, and as an indication of the real value attached to the work, it is significant to note that there are students, including college and university graduates, now registered in the winter short courses for the third successive year. Interest in the work is further shown by the fact that the total enrollment in these courses increased from 716 in the year 1910-11 to 1603 in the year 1911-12. The students of the latter year represented every county in Oregon, 18 other states, and 3 foreign countries. The age of these students ranged from 16 to 84, the average being 35. That the work is of high standard is further attested by the fact that a large number of graduates of different colleges and universities were regularly registered for the short course work, including such institutions as Harvard, Yale, Cornell, Oberlin, Stanford, West Point, and the Universities of Pennsylvania, Virginia, Minnesota, Michigan, Indiana, Illinois, Oregon, and Washington.

Winter Short Courses.

GROWTH OF THE COLLEGE.

Reference has already been made to the number of students registered in the long and short course work, indicating the increase in attendance during the past biennium. The directions in which the College is growing, the rapidity of its development, and its relative needs, are more clearly shown by reference to the work actually done in the different departments and to the number of students taking this work. In Agriculture, for instance, in the regular long courses, there were registered, in 1906-07, 80 students; in 1910-11, 237 students; and on December 21, 1912, 407 students. It will be noted that the increase during the biennium, though the registration for the present year is not complete, has been more than 71 per cent. The increase in the enrollment in the short course work has been even greater,

Phenomenal Growth in Agriculture.

advancing from 56 in 1906-07 to 537 in 1910-11, and to 1,432 in 1911-12. Including agricultural chemistry, the work now offered in the School of Agriculture comprises 198 different courses with 527 semester credits. This is an increase over the last year of the preceding biennium of 32.5 per cent in the number of courses and 39 per cent in the number of semester credits. Furthermore, some of the freshmen classes in agriculture are now so large that it is necessary to divide them into as many as three and four sections.

An investigation of conditions in the different departments will indicate an equally remarkable advancement. The Registrar has prepared a complete report showing the work in detail by courses, sections, hours of instruction per week, and the number of students in each course throughout all the departments of the institution. This report covers the regular long course work only, and the statistics given, therefore, are exclusive of the summer session and the winter short courses.

Report on Regular Long Course Statistics.

From the summaries which these statistics yield, it is found that in Horticulture the number of students during the first semester of 1910-11 was 245; of 1911-12, 273; and up to date of the present semester, 381, or an increase for the biennium of 56 per cent. The increase in the number of students selecting their major in Horticulture has been, in the senior year, 166 per cent, and in the junior year, 283 per cent; while the number of sophomores taking horticultural work has increased during the present year over 1911-12 from 59 to 160, or 171 per cent. In Agronomy, also, the conditions are similar. The number of courses taught has increased 42 per cent during the two years; the number of sections, 65 per cent; and the number of students, from 165 to 325, or 97 per cent.

Horticulture and Agronomy.

In Poultry Husbandry the increase in the amount of work given has been 133 per cent, and in the number of students 39 per cent. The increase in the subjects taken, and in the number of students, in the departments of Dairy and Animal Husbandry has not been so great. On account of certain transfers of courses in these departments from one semester to another, it is not practicable to

Poultry, Dairy and Animal Husbandry.

make comparisons between the first semesters of the three years, as in other departments. The average, however, for the two years, 1910-11 and 1911-12, gives an increase in Dairy Husbandry of 20 per cent in instructional hours, and 25 per cent in the number of students; and in Animal Husbandry, of 10 per cent in the amount of work, and 15 per cent in the number of students.

Domestic Art.

Domestic Science.

In Domestic Art the enrollment in the different courses for the first semester of 1910-11 was 173, and the total hours of class and laboratory work was 55; whereas, in the first semester of 1911-12 there were 282 students, and the total hours of class and laboratory work had increased to 72; and for the first semester of 1912-13 (to November 26), the number of students had increased to 344, and the total hours of instructional work to 99, or an increase in the student enrollment in this work for the biennium of nearly 100 per cent, and in the actual time required in recitation and laboratory hours of 80 per cent. The increase in student enrollment in the Domestic Science courses may be indicated by the following: In the first semester of the years 1910-11, 1911-12 and to December of the present year, the student enrollment in these courses was 200, 246 and 305, respectively, while the actual instructional hours aggregated 47, 56, and 63, respectively—an increase in the enrollment of 53 per cent, and in the instructional hours of 34 per cent; and this, notwithstanding the fact that in the readjustment of courses for the present year the Domestic Science work was advanced from the freshman to the sophomore year, thereby reducing the number of students to the extent of the enrollment in the freshman class in that department.

Forestry, Pharmacy, Commerce.

There has also been a healthy growth in Forestry, the number of students in the different subjects of this department having increased during the biennium from 49 to 70, or 43 per cent. In Pharmacy the registration of students has varied but little during recent years. In 1911-12 there was a slight increase over the preceding year, while the present enrollment shows a depression for the biennium of 5 per cent. The enrollment in the regular course in Comemrce has remained about the same during the past two or three years, though there has been a remarkable increase in the number of students receiving instruction in special commercial subjects required in other courses. For instance, the number of students taking the commercial course during the year 1911-12 was 145, but 539 students in the courses in Domestic Science and Art, Agriculture, and Pharmacy, received instruction in the School of Commerce, in such subjects as farm accounting and business methods, pharmacy accounting, home and private business management, etc. The increase in the total number of students taking work in the School of Commerce during the past two years has been 125 per cent.

Demand for Industrial Accounting.

In the different subjects in the School of Engineering and Mechanic Arts, the increase in student enrollment for the first semester has been from 777 in 1910-11 to 934 in 1912-13 (December 21), or 20 per cent. Although, as stated elsewhere in this report, there has been a great improvement during the biennium in the work in Engineering, it will be observed that the relative growth has not been so great as in other schools, particularly in Agriculture and Home Economics. Conditions in this respect in this institution, however, are not greatly different from those which prevail in similar institutions in other states. An article published in *Science*, December 24, 1909, giving the registration statistics of the leading colleges and universities of the United States, shows that "a general depression is noticeable in the case of the engineering schools, a few recording insignificant gains, but the great majority showing losses, in the case of several 'quite marked.' " President Schurman, of Cornell University, in his report for 1909-10, says of that institution that, "The increase in the number of engineering students is inconsiderable"; and in his report for 1911-12, he gives the total enrollment in Engineering for 1909-10 as 1,745, and for 1911-12 as 1,559, a decrease of more than 11 per cent.

Relative Growth of Engineering.

Statistics showing the growth generally throughout other departments of the College, on the same basis as the above, are briefly summarized in the following table:

Increase in Other Departments.

DEPARTMENT	NO. OF STUDENTS First Semester			NO. INSTRUCT'L HRS First Semester		
	'10-11	'12-13*	Incr'se	'10-11	'12-13*	Incr'se
			%			%
Physics	159	303	91	69	85	23
Zoology and Entomology	114	276	142	37	67	81
Chemistry	314	541	72	82	136	66
Botany and Plant Path.	151	391	159	48	77	60
Bacteriology	93	173	93	26	53	101
Eng. & Public Speaking	1038	1587	53	128	132	4
History	132	165	25	12	21	75
Art and Architecture	229	266	16	48	66	29
Modern Languages	257	338	32	45	50	11
Mathematics	757	749	—1	97	98	1
Physical Education	536	1032	93	20	40	100
Industrial Pedagogy	68	88	29	10	18	80

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*To December 21.

Capacity of College Overtaxed.

From this table it will be noted that the increase in the number of students actually enrolled in the different departments, exclusive of Mathematics, varies from 16 to 159 per cent. In the departments of science, in which the basic work is given for all the technical courses, and which are most expensive and require most room, the increased enrollment is from 72 to 159 per cent; while the increase in the instructional hours varies from 23 to 101 per cent. There has also been an increase of 53 and 93 per cent, respectively, in English and Physical Education. This large increase in student enrollment, and in the amount of work called for, has taxed the capacity of the institution to the very limit, notwithstanding the construction of several new buildings, and the employment of additional instructors. The growth of the College, in fact, has been more rapid than the development of the physical plant, and considerably in excess of the increase in the instructional force. It is apparent, as discussed elsewhere in this report, that to insure thorough and efficient work, large additions to the facilities and instrumentalities of the institution are imperative.

BUILDINGS AND IMPROVEMENTS.

With the appropriations provided for that purpose by the State Legislature in 1911, new buildings have been constructed during the biennium, additional land and equipment purchased, and other improvements made, which have greatly added to the facilities for the work generally throughout the institution. The new buildings, which are more fully described in the appended reports of the Deans, include: The Horticultural Building, completed at a cost of $45,701; the Dairy Building, $35,971; the Farm Mechanics Building, $15,188; the Stock Judging Pavilion, $6,119; the Mines Building, $32,311; and the Shop Building for the foundry, plumbing and steam-fitting, and cabinet work, $10,491. Through the assistance of the Governor in arranging to have brick for these buildings furnished from the State Penitentiary, there was a saving in the total cost of $1,483.08. None of the new buildings are fireproof, but they are of good, substantial construction, and, to the extent of their capacity, will answer the purposes for which they were planned for a great many years. The completion of these buildings has afforded great relief in a number of departments, notably in agriculture, engineering, and science, which had for a number of years been seriously handicapped for want of adequate and suitable room.

New Buildings Provided.

The departments of Horticulture and Botany and Plant Pathology were moved into the new Horticultural Building, which had been especially designed to meet the requirements of these departments. This made possible a number of other changes which have greatly added to the facilities for the work. The department of Bacteriology was transferred from Science Hall into the rooms in the Central Agricultural Building formerly used for Botany and Plant Pathology, where more adequate and suitable quarters were provided for station and student laboratories, and for the offices and class work of this department. The rooms thus vacated in Science Hall were used to relieve the congested condition in Chemistry and Pharmacy in that building. The rooms that had been occupied by the divisions of Horticulture in the Central Agricultural Building were used to enlarge the facilities for the work in Zoology and Entomology, to relieve the congestion in the departments of Domestic Science and Art, and to provide offices for the department of Extension. In the new Dairy Building, splendid facilities are provided for

Better Facilities Provided.

the most modern work in dairy manufacture. The entire first floor and most of the rooms on the second floor are now occupied by the Dairy department, while the other rooms in that building are temporarily used for work in some of the miscellaneous departments, relieving the congestion in other buildings. The rooms in Science Hall that had been used for dairy work have been remodeled and equipped for pharmaceutical laboratories. The new Mines Building is admirably adapted to the needs of the different departments of Mining Engineering, and contains ample room, for the present, for the work of these departments and for the State Bureau of Mines. In the other new buildings, as explained in the Appendices, room is provided for very important work in foundry practice, farm mechanics, stock judging, steam-fitting and plumbing, for which the institution had theretofore had no adequate facilities. It had not been possible before, in fact, to offer work in foundry practice, steam-fitting and plumbing. . . . . .

Armory Completed.

As reported two years ago, the appropriation made in 1909 for the Armory was inadequate; and there being no other funds available, it was impossible to finish the interior of this building. On account of the other comparatively large requirements of the institution, the Board of Regents had not included in its budget an appropriation for the completion of the Armory. At the time of the visit of the Legislature to the College, however, it was agreed by the Ways and Means committees that money should be provided at once for this purpose, and an appropriation of $6,000 therefor was included in the appropriations as finally approved by the Legislature. This building was completed during the summer vacation, 1912, according to the original plans, at a cost of $8,128. This excess cost over the appropriation was caused by the necessity of having to cover all exterior walls with two coats of waterproof cement paint, and to make other improvements not included in the original estimates. The difference was paid from College miscellaneous funds.

Former appropriations for repairs having been inadequate, it was found necessary to spend a large part of the appropriation for the past biennium for general repairs, including the painting of roofs and woodwork, the remodeling of some of the buildings so as to improve their sanitary condition and adapt them to the purposes for which they are now being used, and in making other general and incidental repairs. Among the larger items of improvements may be mentioned the construction of new modern fences on the College farm, the completion of the west wing and front part of the Dairy barn, the remodeling of the Gymnasim building, and the construction of cement walks. The Gymnasium building had been used for some sixteen years, serving the general purposes of the institution as a gymnasium, armory, drill hall, auditorium, and amusement hall. The building was in a bad state of repair. The basement had been provided many years before with locker and bathing facilities, which had become entirely inadequate. The rooms were poorly lighted, without ventilation, and generally in an unsanitary condition. The removal of the Military work to the new Armory, and the appropriation for improvements and repairs by the last Legislature, afforded an opportunity to improve conditions in this building. The first floor, or basement, was entirely remodeled. The locker rooms were enlarged, and larger dressing rooms and modern bath and toilet facilities were provided. A new floor was placed in the main hall, the heating system was overhauled, a system of heating water for the showers by steam was installed, the building was rewired throughout, and the small rooms in one end of the building that had been used by the Military Department were taken out, and this space thereby made available for certain work in physical education. The total cost of remodeling the Gymnasium was $6,190.

General Repairs Made.

Gymnasium Remodeled.

The new cement walks are probably appreciated by the College community and visitors alike more than any other single improvement made on the campus. It had not been practicable during former years to construct any permanent walks, for the reason that no appropriations had been provided especially for that purpose, and the other needs of the College had increased so much more rapidly than the income that no allowance from other funds could be made for the improvement of walks; besides, it had not been possible to complete permanent plans for walks and drives until certain tracts of land had been secured for campus purposes. The new cement walks aggregate about 30,000 square feet with 3,000 linear feet of curbing. These include walks from the Administration Building west to the north entrance of the Agronomy Building, north and southeast of the Agricultural buildings, extending from the entrance to the Dairy Building south to the front entrance of Waldo Hall; east from the intersection of this walk with Jefferson street to the east entrance to the Gymnasium, and from there to the north entrance of the Armory; also, from the front entrance of the new Mines Building to the drive running east and west on the north side of the quadragle. The walks and curbing were built under the direction of the Professor of Civil Engineering and the Campus Superintendent, and are of exceptionally good quality. The total cost was $4,536, the average cost being from 12 per cent to 27 per cent less than the contract price for cement walks in the city.

Cement Walks Constructed.

The heating plant had already been taxed beyond its capacity, and the construction of new buildings made it necessary to enlarge the plant. A new boiler was installed and a complete oil-burning equipment provided. It was found that the use of wood was unsatisfactory; and by constructing a side track from the Corvallis & Eastern Railway line, oil cars are run to the tanks at the heating plant, giving the College the advantage of getting fuel oil at the lowest wholesale price. As a result of this change, the plant is much more efficient, and the cost is less than with the use of wood; besides, to have obtained results at all satisfactory with the use of wood, it would have been necessary to construct a woodshed. The storage of wood, also, required such large area that it was not only unsightly, but interfered quite seriously with the improvement and use of the athletic grounds. The new plant was connected with the Dairy Building, the Horticultural Building, and the Armory, exclusive of the drill hall. The total cost of these improvements was $9,300. For want of funds, it was impracticable

Capacity of Heating Plant Increased.

to extend the heating conduit from the main tunnel to the Farm Mechanics and the Livestock Judging buildings. The new Mines Building was connected with the old heating plant.

Upwards of $66,000 has been expended during the two years for equipment. A large part of this has been used in equipping new buildings. The balance has been apportioned among the different departments according to their relative needs, the larger amounts having been utilized in strengthening the work along the different lines of agriculture, engineering, science, and home economics. Practically all of the special wood equipment, including cases, tables, laboratory and other desks, has been designed and manufactured in the College shops, much of the work being done by College students. The value of the departmental equipment constructed by the College during the biennium was $11,846. The foundry, forge, and machine shops have also been utilized in the manufacture of important equipment, including oil-testing and torsion machines for the Experimental Engineering Laboratory, wood-turning lathes and a large number of smaller or miscellaneous pieces of apparatus. With the rapid growth of the College have come demands, increasingly pressing, for large additions to the equipment of the various departments, required to maintain a reasonable degree of efficiency. This has been true to such an extent during the past biennium that, notwithstanding the appropriation made by the last Legislature, a number of departments are still unprovided with large and important additions to their equipment imperatively needed. The general demands throughout the institution have been such that it has not been practicable to reserve enough of the appropriation to complete the equipment of the new buildings. For instance, the cold-storage plants and other important equipment required in the Horticultural and Dairy buildings are yet unprovided, as also is the equipment for the ceramics and other laboratories in the Mines Building.

Equipment Provided.

In 1911, the State Legislature appropriated $25,000 for the purchase of land. It was expected at the time that the entire amount would be used in procuring tracts surrounded by the campus needed for College buildings. In the report submitted to the Legislature in 1909, and again in 1911, the urgent need of additional land for the agricultural departments was emphasized. No appropriations were made, however, for this special purpose, though, under the law, the Regents were left free to use their judgment in the expenditure of the appropriation in the interests of the institution. After the adjournment of the Legislature, it was found possible to secure a splendid tract of land located near the College farm. Several of the agricultural departments were seriously handicapped in their work for want of more land, and it was finally deemed best, after acquiring the site for the new Mines Building, and two other small tracts immediately required in the development of the campus, to use the remainder of the appropriation towards the purchase of farm land. Investigation had been made, extending over a period of two or three years, within a radius of five miles of the College, but it was found very difficult to secure suitable land at reasonable prices. Although the additional small tracts within the campus not owned by the College must be acquired in the near future, the more pressing need at the time was for farm property, and it was decided that it would be unwise not to take advantage of the opportunity to purchase the farm, so conveniently located, while it was on the market. This farm comprises 115 acres, and cost $22,000. A tract of 30 acres is used by the Horticultural Department, and the balance as a livestock farm. Further information concerning this will be found in the report of the Dean of the School of Agriculture.

Campus and Farm Land Purchased.

At the time the Ways and Means committees of the last Legislature approved the appropriations, including the amount already mentioned for the completion of the Armory, it was understood that from other funds the Regents would provide a small building for the storage of fire-fighting equipment. In accordance with this understanding, a building has been completed at a cost of $400. The building is located near the center of the campus, just north of the new Dairy Building, and provides room for hose carts, ladders, etc., together with a room for the storage of supplies and tools used by the campus foreman. Under the agreement with the

Equipment for Fire Protection.

Fire Department of Corvallis, the city has furnished the equipment for this building, including 600 feet of hose, one hose cart and hook-and-ladder truck, the approximate value of which is $1,500. As a proper protection against fire, it will be necessary, as explained under "Needs of the College," to extend the water mains, provide additional hose and a number of hydrants.

Stock Judging Building Destroyed by Fire, Rebuilt.

Soon after the College opened in September last, the new Stock Judging Building was destroyed by fire. The cause of the fire is unknown, but it is supposed to have started from a stove used temporarily until the building could be connected with the heating plant. The fire occurred during the noon recess, when very few people were on the campus. As soon as it was discovered, the Fire Department was notified, and responded promptly, but before the building could be reached, the fire had gained such headway that it was impossible to save either the building or any of the equipment. The State Board of Building Commissioners was notified, and it is a great pleasure to report that the Board responded at once and arranged for the immediate reconstruction of the building. As soon as the plans and specifications were completed, the contract was awarded, and it is expected that the building will be ready for use again before the end of the present semester. The total cost of the building and of replacing the equipment destroyed will be about $5,000.

AGRICULTURE.

As already indicated, the growth of the agricultural work of the College which characterized the preceding biennium has continued during the past two years. The demands for work in all lines of agriculture, in fact, are increasing at a phenomenal rate. Notwithstading all that has been done to provide for this work, through the construction of new buildings, the purchase of new equipment, and the employment of additional specialists in teaching and research, the rate at which these improvements have been made has been surpassed by the increase in the amount of work required and in the number of students pursuing agricultural courses. This rapid growth may be attributed to two principal causes: first, the greater appreciation on the part of the people of the value of agricultural education; and, second, the extension, revision, and more complete organization of the courses of study and the improvement in the facilities provided, with the resultant increase in the thoroughness and efficiency of the agricultural work. The three principal agricultural activities of the College are research, regular teaching, and extension work, the value of each of which has been fully established. The research work is centered in the Experiment Station. The purpose of this work is to discover new truths, and to determine the best means by which to apply the principles already understood in agricultural practice. Regular teaching has to do with the training of students in course at the institution in the different lines of scientific agriculture; while the function of the Extension Department, as its name implies, is, so far as possible, to carry the advantages of the College directly to the people of the state. Detailed information regarding the development of this work, the plan of organization, and the needs of the several departments, is given in the reports of the Dean of the School of Agriculture, the Director of Extension work, and in the section of this report under "Needs of the College."

Principal Agricultural Activities.

The work in agriculture is well organized. The rapid development of this work in all directions has made it necessary that most of the appropriations to the College for buildings during recent years be used in providing room for the different agricultural departments. With the completion of the buildings provided for by the last Legislature, however, most of the larger departments of agriculture are now fairly well supplied with room. The departments of Horticulture, Entomology, Plant Pathology, and Bacteriology are well provided for in the Horticultural and Central Agricultural buildings, though additional laboratory space will be required next year in Bacteriology and Plant Pathology. A number of additional rooms are badly needed by the Department of Agronomy. These may be secured by the removal of the Domestic Art work from the

New Buildings Provided.

Agronomy Building. A number of agricultural departments, including Agronomy, Horticulture, Entomology, and Plant Pathology, are also in need of additional greenhouse space.

Additional Needs.

The other needs of these departments for the next biennium include the installation of a cold-storage plant in the Horticultural Building and the necessary additional equipment and instructors required by the increase in the amount of work and the number of students.

Special consideration should be given at this time to the further development of the work in animal and dairy husbandry. It is generally recognized that the dairy and livestock industries of the state have not advanced as rapidly during recent years as have certain other lines of agriculture. And yet these industries are basic in the development of a stable and successful agriculture. Their importance, and the relation of the College to their development, were discussed at length in a former report. Since that time many improvements have been made in the Dairy and Animal Husbandry departments. The new Dairy Building has been completed during the past year, and furnished with modern equipment for work in dairy manufactures; a Judging Pavilion has been provided and a splendid farm purchased for work in livestock. Two additional instructors have been employed, one in each of these departments. The work has been more fully organized. Additional subjects have been offered, and greater opportunity afforded the students to specialize in the particular work in which they might have interest. But these departments should be greatly strengthened in a number of particulars if the institution is to serve the state as it should in promoting the great industries they represent. Money should be provided for the purchase of a number of the best breeds of livestock. Two additional buildings are also needed, one on the livestock farm, and the other on the campus near the Stock Judging Pavilion. Additional land is required, also, for pasturage and the production of feed. At least one instructor in animal husbandry, and a thoroughly capable expert of the rank of assistant or associate

Animal and Dairy Husbandry Strengthened.

professor should be employed in dairy production before the beginning of the next school year, as well as an additional instructor whose principal work would be in testing milk and its products. Another improvement greatly needed can be secured through the employment of competent, experienced herdsmen, one in charge of the dairy cattle, and the other, of the herds in the Department of Animal Husbandry. This would involve an increase in the cost of maintenance, but this expense will be far more than offset by the increased efficiency that can be obtained in no other way. Ackowledgment is made of the interest shown in this work, and of the assistance offered in its development, by the Oregon State Grange, the State Dairymen's Association, and the Oregon Pure Bred Live Stock Association, through the adoption of resolutions at the annual meetings of these organizations during the past year.

Poultry Husbandry.

Although the department of Poultry Husbandry was established as early as 1907, the instructional work of the department has been mostly developed during the past two or three years. In 1911, the work was extended and opportunity afforded students to elect their major in poultry husbandry. Up to the present time this year, eight students have entered for the advanced courses, most of them preparing for teaching or research work in poultry subjects. In his report Professor Dryden says:

"During the past two years there have been many applications for men fitted to take charge of poultry departments at other colleges and stations, as well as for men to take charge of poultry farms. We have been unable, up to the present, to furnish competent men for these positions, largely on account of lack of facilities for students specializing in the poultry work."

Should the plan be approved of establishing a poultry breeding plant, discussed in another part of this report, and an appropriation therefor secured, provision can be made at comparatively little cost for the desired advanced instructional work. Probably in no other line of agricultural work can greater returns be secured from a small investment than in the development of the Poultry Department.

In his report four years ago, the President gave the results of an extended investigation of the relative importance in an institution of this kind of a strong course in Veterinary Science. He emphasized the necessity for veterinary work in the development of the livestock industry, and called attention to the great saving in the annual loss from diseases among domestic animals that would result from a distribution over the state of a number of trained veterinarians, and to the obligations the College is under to provide the training required for this work. Since that time, the Department of Veterinary Science has been organized, and during the past two years most of the time of one instructor has been given to this work. On account of the extent and character of the veterinary work and its importance, the full time of at least one instructor should be devoted exclusively to this department. No special facilities have been provided for veterinary work. There is no veterinary laboratory or hospital. Clinics are held in the open air or in one of the old buildings. On account of the danger under such conditions from contagion or infection, clinics are unavoidably limited to an extent that interferes seriously with the success of the work. As explained in the departmental report, it is impossible satisfactorily to provide for the veterinary work without a suitable building and equipment. The report says:

Veterinary Science.

Veterinary Building Required.

> "This building should provide an anatomical and post-mortem laboratory where dissections and post-mortem work can be given; also a clinical and operating room, where all classes of clinical and surgical work can be demonstrated. The building should also be provided with a pharmaceutical and physiological laboratory for the work in materia medica and physiology, and with suitable class room and office. The character of the work precludes the use of other buildings, thus making it necessary for the best interest of the work to provide a veterinary building and stable."

It is estimated that this building, with equipment, will cost approximately $15,000.

Reference has already been made to the importance and growth of the agricultural short courses. Their increasing value, however, warrants a more extended consideration of these phases of College work. Referring to the winter short courses, Dean Cordley says in his report that no other feature of College work has developed more rapidly or is of more relative value. By increasing the number of lectures and demonstrations given each day, and by more thoroughly organizing the work, much greater opportunity is given for specialization, thereby greatly increasing the value of these courses.

Value of Agricultural Short Courses.

The exercises of Farmers' Week have developed remarkably, not only in number and variety of lectures given, but also in popularity and influence, as is indicated by the unusual increase in attendance. The general recognition given to the value of short course work in agriculture is shown by statistics of short course attendance in other institutions quoted elsewhere in this report. Speaking of this work in his report for 1911-12, Dean Bailey, of the New York College of Agriculture, says:

> "It is often said that the Winter Course work will cease to be a part of the College of Agriculture. This is an error. The character of the work will change, but there will always be a strong demand for short terms to enable the people of the state to keep in touch with new facts and forward leadership. The Winter Course students will gradually assume the nature of brief-course specials. The greater the extension of agriculture in the public schools, the greater also will be the necessity for brief and more advanced instruction at the College."

No special provision has heretofore been made for the winter course work, except to the extent of arranging for special lectures and providing incidental supplies and equipment, aggregating in cost from $700 to $1,500 a year. Except to the extent indicated, no account has ever been taken of short course students in the budget estimates for the appropriations required from the State Legislature. The work has grown to such an extent that several of the departments this year urge the importance of providing additional room and certain special equipment for this work. As reported by Dean Cordley, "Already standing room is 'at a premium' in many of the classes, and a large tent has been used during the present year to accommodate some of the work." He urges the importance of an agricultural auditorium or lecture hall, in which there should be rooms

Special Facilities Needed for Short Course Work.

large enough to accommodate the students in lecture and demonstration work in the short courses. Such rooms would also be used throughout the year for judging contests, general lectures, society meetings, and agricultural conventions. Such a building need not be expensive, though on account of its size it would probably cost from $30,000 to $40,000. On account of other even more pressing demands, provision to meet which cannot longer be deferred without seriously impairing the efficiency of the work of the institution, it is not thought that an attempt should be made at this time to secure money for this building. But in the near future, as soon as practicable, adequate provision for room and equipment must be made for the short course work.

EXPERIMENT STATION.

The work of the Agricultural Experiment Station has been extended and improved during the past two years. The different projects provided for by appropriations from the Federal Government under the Adams and Hatch acts have been continued on much the same basis as heretofore, with such changes only as may have been required by the completion of certain work or by its adaptation to changed conditions. With the appropriation made by the State Legislature in 1911 for investigations in horticulture and crop and fruit pests, a number of experts have been employed who devote their entire time to this particular work. Some time was required in getting the work fully organized; but good work has already been accomplished. An exhaustive report has been prepared by the heads of the different departments in charge of this work. For further information reference is made to this report. The appropriation for scientific investigations has given decided relief in providing funds for certain important work for which no provision had theretofore been made. It has also proved of exceptional value in making possible certain routine work, particularly in the departments of Chemistry and Bacteriology. A description of this work will be found in the Director's report.

Crop Pest and Other Investigations.

Branch Stations.

Experimental Work at Hood River.

The establishment of the Southern Oregon Branch Experiment Station in the Rogue River Valley, and of the Dry-Farming Station in Harney Valley, together with the character, extent, and development of the different branch experiment stations, are all described in the report of the Director of the Experiment Station, or in the annual reports of these several stations. For details concerning these subjects, reference must be made to these reports. With the home station at Corvallis, and the five branch stations distributed over the state in such way as to meet the varying conditions in climate and soils, there would seem to be little necessity for additional experiment stations established on the same plan as those already provided. In the solution of the problems peculiar to the Hood River district, special provision for experimental work in that section is urged by the Station staff. But this need not require a permanent station with buildings and other expensive equipment. An office with a small laboratory could be maintained at the most suitable place, and from this, experts could work throughout the district in co-operation with orchardists.

Branch Station Required on Klamath Falls Project.

There is also need for experimental or demonstration work in Central and Southeastern Oregon. The Bureau of Plant Industry, United States Department of Agriculture, proposes to furnish $5,000 a year for this work if located on the Klamath Falls Irrigation Project, provided an additional $5,000 a year can be secured from the state or other sources. It is expected that the U. S. Department of the Interior will furnish the land, buildings, initial equipment, and water for irrigation. The different lines of work would include the demonstration of the best methods of irrigation, with alkali prevention, crop rotation for fertility, utilization of crops for animal production, tillage methods for moisture conservation, and variety adaptability, including potatoes, barley, field peas, roots and other forage crops. The irrigation work in this district would meet the needs for data in practically all of the elevated areas in Central and Eastern Oregon. Should the offer of the Government be accepted, the additional $5,000 required for maintenance should probably be divided between the county and the state, on the basis of half and half, or two-fifths by the county and three-fifths by the state.

There is also great demand throughout the state for other work to determine the best methods, in irrigation, in dry farming, in dairying, and in many other lines of agriculture; but the purpose of this work is to demostrate to the people what these various methods are, rather than to carry on original investigations for the purpose of determining new truths. This, therefore, is extension or demonstration work rather than experimental work, and is described under "College Extension."

In the reports of the Director of the Station and of the Professor of Poultry Husbandry, special emphasis is placed upon the importance of establishing a poultry breeding plant. Professor Dryden says:

Poultry Breeding Plant Needed.

"With sufficient land and the necessary equipment, we not only can more successfully conduct various important poultry experiments, but we can furnish every year two or three thousand pedigreed cockerels to farmers of the state to use in breeding up the laying qualities of their flocks. In a few years this would result in a great increase in egg production. It is safe to say that the increase would equal at least one million dollars a year. But we can do very little along this line with our present land and equipment."

The importance of this work is shown by the fact that while the average production in Oregon, according to the census, was 75 eggs per hen, at the Oregon Experiment Station, as a result of three years' work, one pen of fowls averaged 220 eggs a year, the lowest record being 180 eggs, the highest 251. There is no other way by which the people of the state can get the benefit of this work in any reasonable time, except through the distribution among the farmers of eggs and stock from record fowls. To accomplish this work, from 50 to 75 acres of land will be required, which, with the necessary buildings and initial equipment, will cost approximately $12,000. Starting on this basis, however, it is estimated that the farm will be more than self-sustaining, the income for the first year being estimated at $3,000; the second year, $5,000, and the third and subsequent years, at least $7,000. It is apparent, therefore, that the amount required for the establishment of this plant would be a most profitable investment. Besides, the plant would be of great value to students in the instructional work.

Need for More Land.

Notwithstanding the purchase of the livestock farm, as already reported, there is still great need for additional farm land. Farm values are steadily advancing, and advantage should be taken of the first opportunity possible to acquire the land needed in the development of the agricultural work. As an indication of the land required, reference may be made to the fact that the Kansas State Agricultural College owns 748 acres, and is renting other land; Iowa State College, 1,200 acres; and Michigan Agricultural College, 684 acres. The Oregon Agricultural College has for farm purposes, only about one-third the least amount used by these institutions.

Publication Fund Required.

In addition to the annual reports, it has not been practicable, for want of funds, to publish as many bulletins during the biennium as desired. Five regular bulletins, however, have been issued, varying in size from 47 to 96 pages, and in number from 5,000 to 20,000 copies; and eleven circular bulletins, with from 2 to 40 pages, and as many as 20,000 copies. Since none of the Adams fund can be used for publications, in order to meet the demand for bulletins, the Station should be provided with a publication fund of $5,000 a year.

COLLEGE EXTENSION.

Probably the greatest pressing demand to which the College is not prepared to respond, is for demonstration and other forms of extension work. Notwithstanding the remarkable growth of resident work, the demand for trained men in scientific agriculture, for instructional and research positions in agricultural colleges and experiment stations, as instructors in high schools, and as superintendents or managers of large orchards and farm properties, is far in excess of the number of people qualified for these various positions. As such demands increase and become more persistent, the agricultural courses at the College will attract correspondingly larger numbers of the more capable and ambitious students. But with this development in agricultural education of collegiate grade, has come, during the later years, a great awakening among the people to the importance of disseminating up-to-date knowledge in usable form directly among the farm population. Whatever be the achievements in the discovery of new scientific truths, or their value as applied in agriculture, or to whatever extent the relatively few who are able to enjoy the advantages of college training may master the basic principles upon which rests a stable and successful agriculture, the great problems confronted in the general betterment of rural life conditions can be solved only in the open country, out on the farms and in the homes of the people who are in daily contact with these problems. Hence the demand, now nation-wide, for extension work.

Resident Work Not Sufficient.

In his biennial report four years ago, the President of the College, discussing at length the question of extension work and its development throughout the United States, emphasized the importance of organizing an extension department in the Oregon State Agricultural College. The following is taken from that report:

"One of the most pressing needs in the development of agriculture is for the different phases of extension work which carry to the farmers up-to-date information on agricultural subjects. It is being recognized more and more that the matter of superceding by modern scientific work the methods that have characterized agriculture in the past, is a question of educating the people on the farms. At best, comparatively few of the farmers of the state can pursue work in residence at the College. New truths are being discovered, and new applications are continually being made of principles already known. But these are of practical value only to the extent that they are understood and utilized by the farmers. So important has the matter of college extension in agriculture come to be regarded, that there is probably more attention being given to it at the present time than to any other phase of agricultural education. On account of the remarkable development of agricultural science along all lines during recent years, the matter of improving the farms of the country is not now so much a question of discovering new truths, as it is of securing the practical application of facts already understood."

Since that time, great advancement has been made in the land-grant colleges in organizing and developing different agencies for extension work. These include not only the farmers' institutes, which, for many years, were the only agency through which the agricultural colleges attempted to carry instruction directly to the people, but demonstration trains, itinerant schools, etc. The increased interest in this work, and the importance attached to it, are indicated by the fact that while in 1906-07 fewer than 4.000 farmers' institutes were held in the United States, with a total attendance of about 1,600,000, during the year 1912, there were more than 19,000 regular institutes, with an aggregate attendance of 2,590,371. In addition, special institutes were held, with an aggregate attendance of 1,389,266, making a total attendance at institute meetings of nearly 4,000,000. Besides these, 164 movable schools were held, with an aggregate attendance of 137,699. Fifty-one railroad instruction trains were run, attended by 958,605 persons. Of the regular institutes, 388 were for women, with an attendance of 53,194. In addition to these, 45 movable schools for women had an attendance of more than 11,000; and 28 movable schools for young people, an attendance of 6,051. Eleven states employed 80 experts as itinerant instructors and advisers. In some of the states, fewer farmers' institutes were held, the work more largely taking the form of itinerant schools. The cost of this work in the United States during the year 1911-12 was $468,000.

General Extension Statistics.

As explained elsewhere in this report under "Courses and Organization," the Department of College Extension was organized in the Oregon State Agricultural College in 1911. The different extension agencies include institutes, publications, itinerant schools, correspondence courses, demonstration farms, field advisers, instruction or demonstration trains, and exhibits at state, district, and county fairs; besides various organizations, such as boys' and girls' clubs, etc. No special funds were available for this work except the $2,500 appropriated for farmers' institutes. However. by using the members of the faculty and of the Experiment Station staff, so far as possible consistent with their other duties, and thereby avoiding the necessity of paying salaries, and with the co-operation of the railroads in providing demonstration cars and trains and in furnishing transportation to extension workers, a great deal of valuable work has been accomplished. During the year 1911-12, there were held 123 regular institutes, with 189 speakers, covering 252 days, and with an aggregate attendance of 26,936. Including special institutes, 29 different counties were visited and 281 meetings held, covering 464 days, with 236 College speakers and 23 local speakers, and an aggregate attendance of 66,342. In co-operation with the State Superintendent of Public Instruction, the department also did good work in promoting the development of industrial instruction in the public schools. Through the support of the State Bankers' Association and the Portland Union Stock Yards Company, two field men were employed who gave their entire time to this work. These men visited schools in every county in the state, and gave instruction to more than 40,000 school children. Three regular faculty members also devoted 15 days to this work, giving instruction to some 7,000 school children. Six extension bulletins were published during the year, aggregating more than 155,000 copies.

Extension Work In Oregon.

Conditions in Oregon are so varied, with an altitude in agricultural districts ranging from sea level to more than 5,000 feet, an annual rainfall of from six to seven inches to upwards of 100 inches, and a corresponding variation in soil and climatic conditions, that there is unusual demand in this state for extension work. To meet this demand, special funds must be provided. First, there should be a regular staff of extension instructors who can devote their entire time to work in connection with the movable schools, institutes, demonstration

Special Facilities Required.

U. S. Department of Agriculture to Assist.

Field and Demonstration Work.

trains, etc. To organize this phase of extension work on a proper basis, with the necessary instructors and office force, including salaries, traveling expenses, supplies and equipment, would require an appropriation of at least $25,000 a year. In addition, provision should be made for agricultural field and demonstration work. The more satisfactory plan would be to place this on a co-operative basis, the state and the several counties contributing towards the expense, with the use of such funds as can be obtained from other sources. The U. S. Department of Agriculture, through the bureaus of Animal and Plant Industry, has offered to co-operate with the Agricultural College in this work to the extent of providing $2,500 a year for field dairy work, and $6,400 a year for work in farm management, on condition that the state shall duplicate these amounts. By using the existing experiment stations as centers from which to work in the different districts represented by them, it is not thought necessary to maintain expensively equipped permanently located demonstration farms, the better plan being to do the demonstration work in co-operation with the farmers. This plan is much less expensive, and on the whole, more effective. The plan that seems most successful in states where this work has been developed, requires the counties or districts to furnish certain funds for use in farm demonstration and field work, conditioned upon which, a certain relative amount is provided by the state.

The plan of organization and the extent and character of the extension work are discussed at length in the appended report of Director Hetzel.

FORESTRY.

There is increasing interest in the work of the Forestry Department. A larger number of students is enrolling for this work each year. The courses of study have been completely revised during the biennium, the purpose being to meet the requirements for professional instruction in forestry and to adapt the work to the peculiar needs of the state. Instruction at the College has been supplemented by study and practical work in the mills and forests during the vacation periods. Good work has been accomplished. The present facilities for the work, however, are entirely inadequate. No special room designed for the peculiar needs of the department has ever been provided, and but little equipment. But the time has arrived in the development of this work, when much more room and large additions to the equipment are required. The importance of the work is indicated by the fact that the state has an annual income from the lumber industry approximating $30,000,000. It is estimated, moreover, that there is an annual loss from preventable causes of from $3,000,000 to $5,000,000. As stated in the President's report four years ago, "To reduce to a minimum the losses from diseased timber, and from the wasteful methods of harvesting the timber crop, and otherwise to conserve the forest resources and develop the forest industry, a large number of men are required who have had thorough, scientific training in forestry."

Importance of Forestry Courses.

It is very gratifying to note the interest being taken in the development of forestry work at the College by persons engaged in the forest industry. A committee representing the Oregon branch of the Pacific Logging Congress visited the College in October, 1912, to investigate the practicability of enlarging the field of the forestry work, so that more adequate opportunity may be afforded for the special training required in the lumber business. As indicating the demand for such training, it was reported that the lumber industry in Oregon employs during the year 22,000 workers, who receive in the aggregate approximately $14,000,000 in wages. The lumbermen of the state urge the importance of developing courses at the Agricultural College such that the young men desiring to follow lumbering as a business may have the same opportunity for training as is now offered those who are preparing for agriculture, engineering, or commercial pursuits. They urge that the College, in addition to the work now offered, should establish a course in Logging Engineering. In conference with this com-

Necessity for Extending Forestry Work.

mittee, the head of the department prepared a tentative course in Logging Engineering. As explained in the report of Professor Peavy, the fundamental studies in this course would be much the same as in the other engineering courses at the College, while the distinctive work would include such subjects as logging railroads, forest surveying, timber cruising, mapping, bridge construction, steam machinery, general study of timbering, logging devices and equipment, camp sanitation, explosives, and electrical machines. The plan contemplates having students in this course spend their summer vacations in logging camps, where they will receive the practical field work required in connection with instruction at the College. One particular advantage of this plan is the fact that students will receive regular wages for the field work, thereby enabling them to earn a large part of the money required to meet their College expenses. This work is undoubtedly very important; and it is, therefore, recommended that the course in Logging Engineering be established at once.

Demand For Logging Engineering Course.

Although the engineering laboratories and other facilities will be used for much of the work, to provide properly for the courses in Forestry, including Logging Engineering, as described in detail in Professor Peavy's report, a special building with equipment will be required; also at least one additional instructor. The building should be large enough to afford laboratory room for logging equipment, forest pathology, forest entomology, and other special work, in addition to offices, drafting, and recitation rooms.

Building and Equipment Required.

NOTE—Since this report was composed, the Board of Regents, at its meeting held on January 8, 1913, established the course in Logging Engineering, and authorized the President to make application to the State Board of Higher Curricula for its approval. The details of the plan are being worked out by the Professor of Forestry, in conference with representatives of the Loggers Association. This Association assumes the responsibility of taking the initiative in the matter of securing the necessary appropriations for the buliding and equipment required for the forestry work.

Logging Engineering Course Established.

DOMESTIC SCIENCE AND ART.

A department of Household Science in the Oregon State Agricultural College was established as early as 1890, courses being offered in cooking and sewing, and a specialist employed for this work. In 1908, the work was organized into a School of Domestic Science and Art. The faculty was enlarged, and, with the completion of Waldo Hall, new laboratories were provided. Since that time, the rapid growth of the work has made necessary the equipment of additional laboratories and work rooms, and the employment of additional instructors. The present organization comprises two departments—one in Domestic Science and one in Domestic Art, with a faculty of ten. The development of the work has been such that after completing the necessary general and basic subjects, students may now specialize either in domestic science or in domestic art. Within each of these fields there is further opportunity for specialization, as in dressmaking and tailoring, millinery, hand-work, household decoration; or in dietetics, home nursing, home management, etc. Students may also major in the work required in preparation for teaching positions.

School Organized.

On account of the broad field now covered by the work, it would undoubtedly be more appropriate, as recommended by Dean Calvin, to change the name of the school to Home Economics. The school may then comprise such departments as domestic science, domestic art, household administration, extension, etc. As defined by Dr. A. C. True, "Home Economics, as a distinctive subject of instruction, includes the economic, sanitary, and aesthetic aspect of food, clothing, and shelter, as connected with their selection, preparation, and use by the family in the home or by other groups of people." A discussion of the different phases of this work will be found in the Dean's report.

The school of Domestic Science and Art occupies parts of three different buildings, part of the work being in Waldo Hall, part in the Agronomy Building, and part in the Central Agricultural Building. On account of the great increase in the amount of work and in the number of students pursuing courses in domestic science and art, these accommodations have become entirely inadequate. Besides, the rooms now used for the domestic arts work in the Agronomy Building, must be vacated in order to provide the additional room required by the Department of Agronomy, and the rooms in the Central Agricultural Building occupied by the Dean of the School of Domestic Science and Art are required by the departments of Bacteriology and Plant Pathology. The Domestic Science work is located in the basement of Waldo Hall. The rooms provided for this work answered the purpose fairly well with a student enrollment of from 150 to 200, requiring but two or three instructors; but with an enrollment aggregating upwards of 300, requiring the full time of five instructors, the congestion is such that it is impossible to do satisfactory work, even with the number of students now in attendance. Additional room cannot be secured in this building. Moreover, the introduction of domestic science and art into the high schools of the state, and the greater appreciation on the part of the people of the value of training for home life, will undoubtedly result in even a greater increase in the enrollment in this work. Aside, therefore, from the necessity of vacating rooms now occupied by this school in the agricultural buildings, in order to provide for the expansion of the agricultural work, it is imperative that large additional room be provided for the work in domestic science and art. In fact, to care properly for this work when the College opens in September, 1913, the room space should be practically double what it is at present. There is no way by which to provide this room, and at the same time relieve the congestion in the departments of Agriculture, except through the construction of a special building for home economics. In order to provide for future growth, this building should be considerably larger than required at the present time. Parts of the building could be temporarily used to relieve the congestion in other departments, and the room thus used could be vacated as may be necessary in providing for the growth of the domestic science and art work. Architects, who have prepared preliminary plans, estimate that a building containing the room required would cost, according

Accomodations Inadequate.

New Building Required.

to the kind of construction, from $137,000 to approximately $228,000. The cheaper building would be the best type of mill construction; the more expensive, fire-proof. The building has been planned in sections so that, if necessary, parts of the building can be constructed at different times. To meet present needs, however, at least one wing and the central part should be built at once. Other requirements of this school, including equipment and additional instructing force, are discussed in the section of this report on "Needs of the College."

ENGINEERING.

Marked Advancement During Biennium.

Although the increase in student enrollment has not been so great in the School of Engineering and Mechanic Arts as in Agriculture and Home Economics, the better preparation of those who are entering the Engineering courses, the advancement of the standard, the purchase of additional equipment, and the construction of new buildings, have all contributed to an advancement that has been marked during the past two years. Through the organization of optional groups in the Mining and Civil Engineering courses, wider opportunities are afforded the students to specialize in particular work, thereby adding to its interest and value. The reports of the heads of departments show great improvement in the work of students. On account of the limited demand for engineers of the highest grade, emphasis is also placed upon the importance of maintaining the highest standard possible. Engineering education enjoyed its greatest growth in this country during the last quarter of the nineteenth century and the first part of the twentieth century. During the last decade or two, the people have come to realize the great value of agricultural education, and the agricultural courses are becoming correspondingly more popular and will no doubt continue to increase in interest. Notwithstanding this, however, engineering education will hold a large and important place in higher institutions of learning. As recently stated by a well known authority, "The fundamental principles on which the training of engineers is based, constitute an admirable curriculum for the education of young men who are to take any of those forms of business which are connected with manufacturing and transportation and construction. And increasing numbers of young Americans seek to prepare themselves by education for such business careers." In a comparatively new and rapidly developing state like Oregon, particularly, will the establishment and operation of manufactories, the development of mineral resources, the development and utilization of water power for manufacturing and transportation, the reclamation of large tracts by irrigation and drainage, the improvement and construction of public highways, the harvesting of forest products, the building of cities, and many other lines of industry, create an ever-widening field for the trained expert in different lines of engineering. The number required will not be so great as in some other industries, but the field will be no less fruitful nor the demand less exacting. Consequently, the departments of Engineering at the College are not interested so much in the number of students as in the standard and quality of the work. The courses are planned with the view of giving the best possible training for the particular field to be occupied in the engineering profession.

Continued Demand For Engineering Education.

Recognizing the need in Oregon for trained experts and advisers in the improvement of public highways, a course in highway engineering was established at the Agricultural College in 1911, but for want of funds, this course has not been developed to the extent desired. By the opening of the College next year, however, ample provision should be made for this work.

The development of large irrigation projects, and the more general use of irrigation in different parts of the state, create a demand for special engineering education that the College should be prepared to meet. As soon as practicable, a professorship in irrigation engineering should be established, and the work so adjusted that students may have opportunity to specialize in irrigation as well as in other divisions of civil engineering. Expensive equipment would not be required, though the work should

Demand For Irrigation Engineering.

be in charge of a man with the highest standard of training and the broadest possible experience in connection with irrigation matters. Preferably, also, should he have had training in agriculture, because of the inter-dependence of agriculture and engineering in the solution of the problems with which he would have to deal. In connection with irrigation, and often resulting from it, important drainage problems frequently arise which could also be handled by the irrigation expert, in cooperation with the agronomist. On account of its importance, particularly on the reclamation irrigation projects, this work is being strongly advocated by Government officials in the Reclamation Service.

More Room Needed.

With the completion of the new Mines and Shop buildings, much better facilities are provided for the work in the School of Engineering, particularly in the Mining Department. As explained in Dean Covell's report, however, there is need for additional room in providing properly for some of the work in civil and mechanical engineering. The congestion in these departments may be somewhat relieved by the removal of the Department of Physics from Mechanical Hall. This department itself is very much over-crowded in the present quarters, and it will be necessary, in the near future, to provide it with additional and more suitable room elsewhere; otherwise, some other provision will have to be made for certain phases of the engineering work, as well as for additional laboratory space for physics. In the Dean's report will be found additional information regarding the work and requirements of the School of Engineering.

COMMERCE.

The work in the School of Commerce has been improved during the biennium by the establishment of a professorship in Political Economy and by a more complete organization and development of the different courses or subjects of instruction. As classified at present, the work is organized under four divisions: (1) Business Administration, including the subjects of elementary and advanced accounting, auditing, business management, theory and practice of advertising, farm accounting and business methods, pharmacy accounting, home and private business management; (2) Political Economy, including commercial geography, history of commerce, economic history of the United States, money and banking, trade and transportation, rural economics, rural and practical sociology; (3) Political Science, including such subjects as state and municipal government, commercial law; and (4) Stenography and Typewriting. The professional courses are arranged primarily to meet the needs of the prospective business manager and office employee. Recognizing, however, the importance of business training in all vocations, particular emphasis is placed upon the different courses in business methods planned especially for students in Agriculture, Forestry, Pharmacy, Home Economics, and Engineering. The relative importance in this institution of the two classes of work mentioned is shown by the fact that while in 1911-12 there were 145 students regularly registered in the course in Commerce, aggregating a total enrollment in the different commercial subjects of 511, the number of students in the other courses named who were pursuing subjects in the School of Commerce was 539. At the present time, the total enrollment in the different classes in the School of Commerce aggregates 911. Of these, 457 are regular commercial students, and 454 are registered in the other different courses named above, but are pursuing certain special work in commerce. Considerable interest is also taken in the correspondence work of this school, there being 75 correspondence students pursuing work in farm accounting and business methods, rural law, and rural economics.

School Organization.

Business Training in Other Courses.

PHARMACY.

As explained in the report of Professor McKellips, the Department of Pharmacy has been transferred during the biennium from Alpha Hall to Science Hall. During part of last year, the department labored under some disadvantages on account of the congested condition in this building caused by the unavoidable delay in transferring the departments of Dairying and Bacteriology to the Dairy and Horticultural buildings. There are a number of advantages in having the departments of Pharmacy and Chemistry in the same building; and, if funds can be provided for remodeling Science Hall in accordance with the proposed plans, the Department of Pharmacy, being permanently located and supplied with ample and suitable room for the different laboratories, will have facilities far superior to those heretofore provided. A revision of the course in Pharmacy will thereby be made possible, and with the necessary addition to the instructional force, the department will be in a position to maintain a high standard of efficiency.

Permanent Quarters Provided.

INDUSTRIAL PEDAGOGY.

In his report four years ago, the President discussed at length the importance of modifying the courses of study in the public schools by the introduction of industrial work in such subjects as agriculture, home economics, and manual training, and emphasized the necessity for specially trained teachers for this work. In recognition of the leadership of the agricultural colleges in promoting industrial education along all lines and in all grades, the United States Congress had just passed a law, known as the Nelson Amendment, making further appropriation to the land-grant colleges, in which special provision was made for the expenditure of part or all of the appropriation in training teachers for industrial work in the public schools. It was in response to this demand that the Board of Regents established the professorship in Industrial Pedagogy in the Oregon State Agricultural College. During the following year, 1910, a professor was employed and the department organized. Students preparing to teach industrial subjects receive their special training in agriculture, home economics, or manual training in the regular technical departments of the College and their professional or pedagogical work in the Department of Industrial Pedagogy.

Department Organized.

In the appended report of Professor Ressler is given a detailed account of the growth of the department and of the extent and character of the work being done, together with the demand for it. At the time this department was established, there was no provision in any of the high schools of the state for agricultural work, and practically none, outside of Portland, for any other technical subjects, with the possible exception of a little work in manual training. Since that time many of the high schools have established regular courses in agriculture and domestic science, and the increased interest in this phase of education indicates that in the very near future practically every high school in the state will offer work in industrial subjects. This rapid growth of interest in industrial education is general throughout the United States. In his report for the year 1912, Dr. A. C. True, Director of the U. S. Office of Experiment Stations, says that "the total number of secondary schools teaching agriculture in the United States has increased from 566 in May, 1910, to 2,103 at the present time." He further reports that "of the colleges, public and private, and all grades of lower schools teaching agriculture, the number on the lists of the office increased from 863 in 1910 to 2,575 in 1912, an increase of nearly 200 per cent in two years."

Development of Industrial Education.

Professor Ressler estimates that to meet the present needs in Oregon for vocational training in the public schools, at least 260 trained industrial teachers are required, and that with that number in service, with the natural growth in population, there will be a demand in this field for 50 new teachers annually. To meet this demand would require an enrollment in the Department of Industrial Pedagogy of between 200 and 300. Should this estimate be reduced by at least one-half, it would still indicate the magnitude of the very important work required of this department. Besides giving regular instruction at the College, moreover, it is necessary that representatives of the department attend county teachers' institutes and other meetings of teachers and school boards and rural school advisers, as a means of assisting in the organization and development of the industrial work. There is no other College service of the same magnitude that is of greater importance to the state.

Trained Teachers Required for Industrial Subjects.

MISCELLANEOUS DEPARTMENTS.

In the Registrar's report, and in a preceding section of this report, will be found information regarding the student enrollment and the work of the different miscellaneous departments of the institution. Reference has already been made to the crowded condition in the departments of Physics and Chemistry, and the necessity of providing more room for these departments. If the Department of Forestry can be removed from Science Hall and this building remodeled as explained under "Needs of the College," ample room for the present will thereby be secured for the Department of Chemistry. The requirements of the departments of science for additional equipment are given in detail in the section of the report on "Itemized Estimates of Requirements." With the possible exception of Mathematics, History, and Military Science and Tactics, all the departments will require additional instructors during either the first or second year of the biennium. Lists of these will also be found in the Appendices.

MILITARY SCIENCE AND TACTICS.

The Military Department is in excellent condition. The regiment at the present time numbers 872, with the enrollment for the year estimated by the Commandant at 970. The Armory, provided for by the Legislature in 1909 and completed with an appropriation made by the Legislature in 1911, is in every way admirably adapted to the needs of the department. This building consists of two parts—a three-story section 50 by 120 feet, which contains the armory, offices, and gallery; and the drill hall, 120 by 300 feet, with sufficient capacity for the accommodation of 1,000 cadets. This provides ample room indoors for drill, so that the work of the department is not interfered with by inclement weather. This has been of great assistance in attaining the high standard of excellence maintained during recent years. The character of the work done is indicated by excerpts from the official report of Capt. H. L. Laubach of the U. S. General Staff Corps, who inspected the regiment in May, 1911:

High Standard of Efficiency Maintained.

"In the morning the regular inspection was held. It consisted of regimental review, inspection, drill and normal attack, and battalion drills. The review was well and correctly performed. The band is excellent. The marching was very good. At inspection, uniforms were neat, clean, and well-fitting. Condition of arms and equipment, excellent. The set-up was excellent. The regiment was well handled by the cadet colonel and other officers in the regimental drill. Battalion drills and the attack were very well executed. In the afternoon there was a parade which was excellent, followed by a review to the Governor of Oregon. This was also excellent, showing careful training and careful attention to details."

On account of the size of the regiment, and the amount of clerical work required to keep a careful and accurate check on records of attendance, it has been necessary to arrange for the employment of a retired non-commissioned officer to assist in the department. This, however, involves a cost of only about $500 per year.

MUSIC.

Although maintained without expense to the College, the instructors all depending for their compensation upon receipts from student fees, the School of Music is a very important part of the College organization, not only because of the opportunity it gives students who are interested in music to get the training desired, but also because of its value in the social life of the institution. In addition to the individual work on different instruments and in voice, there are the military band, the glee club, and other general organizations, in which students get the benefit of training with little or no other cost than the time required for practice. The instructors and students in music and the different musical organizations give their services willingly, without charge, in furnishing music for various College functions.

PHYSICAL EDUCATION.

The importance of regular, systematic physical exercise is now recognized in all institutions of higher learning. To conserve the health and insure the symmetrical physical development of the students, the Department of Physical Education in the Agricultural College has been more completely organized, with experts specially trained for the work in charge of each of the divisions for men and women. While recognition is given to the importance of all kinds of athletic sports and contests, the special aim is to reach all the students, with particular attention to those who have no interest in athletics and who are most disposed to neglect the care of their physical health. The relative value of physical training in an educational institution is indicated by the following statement by Dr. Anderson, Director of the Yale University School of Education:

Department More Fully Organized.

"If we define education as a 'preparation for complete living,' it follows that physical training, in all its branches, is a vital part of every worthy scheme of education. In a vast number of cases, men and women are spending years of their lives and large sums of money upon the cultivation of their mental and moral powers, while their bodies go all uneducated. The necessary co-worker upon which the intellect must depend for its successful achievements is neither trained nor strengthened; and, when it is most needed in middle or later life, it is often found unequal to the efforts which would have been easy had it received a fraction of the care given to the other member in the partnership of mind and body."

Physical Training Vital Part of Education.

With reference to the same question, Dr. Newcombe declares:

"The man who, in the future, is to win the admiration and command the respect of his fellow men by his works must possess the robust qualities of body, as well as the finer qualities of the intellect. * * * The large majority of men who are to be leaders in this and the next genera tion will be trained at colleges and universities. It is essential to their efficiency that they shall not be mere scholars and bookworms, but physically strong and courageous, ready to sacrifice ease and comfort to the exigencies of their work. * * * We wish the men of our nation to be capable of carrying on great work. The best and most effective work cannot be done unless the doer enjoy good physical health."

Again, Dr. Sargent, of Harvard University says:

"Among the virtues attributed to physical education will be increased powers of attention, increased development of the will, greater accuracy in execution, alertness, quickness of perception, perseverance, rapid and responsible exercise of judgment, forbearance, patience, obedience, self-control, loyalty to leaders, courage of convictions, and ability and willingness to serve any cause that makes for the betterment of man. These, I say, are some of the virtues that may be developed through the physical activities, and, I might add, be best developed through this agency."

Virtues of Physical Education.

These quotations are given from experts in the field of physical education as indicating something of the value which is attached to the proper care of the body and to physical training. Colleges and universities are frequently criticised because of the emphasis placed upon intercollegiate athletics and the resultant over-training of the athletic type of students already healthy, strong, vigorous, and well developed physically, to the neglect of the great majority of students who have little or no interest in athletic contests, but who are most in need of physical training. Upon this question Dr. Newcombe says:

"We have in actual operation a system which trains those who do not need training and leaves those who do need it to take care of themselves, without offering them any incentive. * * * The worst outcome of the present policy is not merely waste of effort through exerting it where it is not needed, but actual discouragement of effort among those who most need to make it."

As shown in the appended reports of the professors of physical education, the enrollment at present in this department of the College includes upwards of 800 men and 300 women. For a detailed statement regarding the work, reference is made to these reports. In each, particular emphasis is placed upon the impossibility of doing satisfactory work under present conditions. In discussing this question, Professor Thayer says:

"In order to conduct a first-class Department of Physical Education for the women of the College, both place and time must be allotted for the classes. The present Gymnasium is entirely inadequate in size, plan, and equipment. Every phase

Physical Training for Women.

Additional and More Suitable Rooms Needed.

of the work is handicapped by the lack of suitable quarters or apparatus. For example, the girls have the use of the Gymnasium for but three afternoon periods during the entire week. This eliminates for many the chance for systematic exercise in the recreative hours from four to six o'clock; and, if they have no vacant morning periods, obliges them to make use of the noon hour from twelve until one o'clock, a most undesirable time, because of fatigue and hunger, for physical training. This affects much the value as well as the popularity (which is important) of the work. At present, not a single corrective class has the use of the Gymnasium alone. The boys are on the floor at the same time that the girls are given whatever exercises are possible, in a corner of the gallery or on the porch or roof, where there is neither privacy nor proper apparatus. The importance of the corrective work cannot be over-estimated; so great results are possible as to change the entire lives of many girls. A corrective room with proper apparatus and a rest room in connection, is essential. For girls in poor physical or nervous condition, after special exercises or massage, relaxation movements and rest should be taught as carefully as any other course in physical education. In the University of Wisconsin, great importance is given the 'rest classes,' and we have continued need for them here, but no place."

Emphasizing the importance of a new building for gymnasium work, Dr. Stewart, in his report, says:

Gymnasium Inadequate.

"The present building was erected, at a comparatively low cost, nearly twenty years ago. At that time, the enrollment of the entire College comprised only about 400 students, and physical education had not yet reached the stage of its development when its importance was emphasized, or even recognized, as it is today. The building is inadequate not only in floor space, but in ordinary essentials, such as rooms, fixtures, and equipment. There are but 500 lockers in the men's locker room, while there are eight hundred men to use them. There are even fewer lockers in proportion to the number of students using them in the women's locker room. This means that there are often two, three, and even four or five students using the same locker, a condition which is so embarrassing, unsanitary, and unhygienic as to be deplorable. In many instances it is necessary to apportion a certain locker to students who are unacquainted with each other, a situation which often provokes decisive objections against conditions which make this necessary."

New Men's Gymnasium Required.

As a further indication of the inadequacy of the present quarters for the work in physical education, reference may be made to the fact that while there are 320 girls in this work, with as many as 100 in a single class, there are but 11 showers in all, and only 86 lockers—and no room for more. The Gymnasium building, in fact, is entirely inadequate and unsuitable for the work of both men and women. Considered from the point of view of sanitation and health alone, not to mention the general importance of physical training, the present congested condition in this building is indefensible. In the interest of all the students who come to the College, too great emphasis cannot be placed upon the importance of procuring a new Gymnasium at the earliest possible date. This could be used for the men, leaving the present building for the exclusive use of women. With the improvements made during the past biennium, and the expenditure of a few hundred dollars in making the necessary changes in adapting the building to the needs of women, particularly for corrective, remedial work, and in providing more perfect ventilation, this building would serve the purpose of a Women's Gymnasium for a number of years. Plans have not been completed for the Gymnasium, but preliminary sketches have been prepared, and it is estimated that if constructed of reinforced concrete, similar to the Armory, a building sufficiently large would cost approximately $75,000. If the full amount cannot be provided at this time, it would be possible to put up the shell of the building and complete the main floor, with one or two locker rooms, leaving all the balance unfinished, for from $40,000 to $50,000. Since the College has no Auditorium, and there is little prospect of getting one for a number of years, the main floor of the proposed new Gymnasium could be used also for convocation and other general assemblies.

LIBRARY.

The Library comprises upwards of 22,000 bound volumes and 35,000 pamphlets. Periodicals to the number of 418 are regularly received; of these, 268 are subscribed for by the Library and 150 are received gratis. As reported in 1909 and again in 1911, the College has no library building. The books are stored in five different class rooms, while the reading room has a seating capacity of only 108 readers. With the present enrollment, under present conditions, it is impossible for more than a small percentage of the students to use the Library. The importance of adequate library facilities in all of the work throughout the institution cannot be over-estimated. Furthermore, purely as a matter of business, provision should be made at least for fireproof stack rooms. For additional information, special reference is made to the report of the Librarian in the Appendices.

Library Building Needed.

COLLEGE FINANCES.

In the appended report of the Treasurer will be found in detail an account of the receipts and expenditures of the College for the two years, July 1, 1910, to June 30, 1912; and for the branch experiment stations for the calendar years 1911 and 1912. From these reports it will be seen that there are three principal sources of income:—

Sources of Income.

I. The Federal Government:
  1. Land Grant of 1862, for instructional purposes.
  2. Morrill Act of 1890, for instructional purposes.
  3. Hatch Act of 1887, for agricultural experimental work.
  4. Adams Act of 1906, for agricultural experimental purposes.
  5. Nelson Amendment of 1907 to the Morrill Act of 1890, for instructional purposes.
  6. Department of Agriculture for co-operative experimental work in agriculture.

II. The Oregon State Legislature.

III. Student Fees, Miscellaneous Sales, etc.

Segregated, the amounts received from the different sources indicated are as follows:—

I. From the United States Government:
  1. For instructional purposes, annually—
    Act of 1862—Interest on Land-Grant fund, approximately ....$ 11,000

Act of 1890	25,000	
Act of 1907	25,000	$ 61,000
2. For experimental purposes, annually—		
Act of 1887	$ 15,000	
Act of 1906	15,000	
Department of Agriculture—		
Dry-farming stations in Harney and Sherman counties	3,500	
Irrigation station on Umatilla Irrigation Project at Hermiston	3,000	$ 36,500
II. From the Oregon State Legislature—		
1. For maintenance, annually		$150,000
2. For farmers' institutes, annually		2,500
3. For buildings, improvements and repairs, library books and periodicals, purchase of land, equipment, etc., for the two years 1911 and 1912		273,500
4. For branch experiment stations, annually—		
Eastern Oregon, at Union	$ 7,500	
Umatilla, at Hermiston	3,000	
Sherman County, at Moro	2,500	
Harney County, near Burns	4,000	
Southern Oregon, at Talent	5,000	22,000
5. For crop and fruit pests and horticultural problems, annually		15,000
6. For scientific agricultural investigations, annually		10,000
III. From Miscellaneous Sources:		
1. For instructional purposes, annually— From student fees and departmental sales. These in the aggregate are about sufficient each year to meet the cost of laboratory, shop and miscellaneous supplies, approximately.		20,000
2. For experimental purposes annually— From sales of farm products approximately		10,000

The distribution of the annual income between the College and the Experiment Stations is as follows:

I. For instructional purposes—			
1. From U. S. Government		$ 61,000	
2. From Oregon State Legislature		150,000	
3. From miscellaneous sources, approximately		20,000	$231,000
II. For experimental purposes—			
1. From U. S. Government		$ 36,500	
2. From Oregon State Legislature		47,000	
3. From miscellaneous sources—			
Home Station, approximately	$7,000		
Branch Stations, approximately	3,000	10,000	93,500

In connection with the above, it is important that attention be called to the fact that by the Federal appropriations for experimental work the cost of maintaining the College is in no way reduced. On the contrary, additional funds are required from the State as a condition of receiving these appropriations. Members of the faculty who have experimental work receive part of their salary from the Federal experimental funds, but that part of their time which is devoted to instructional work must be paid for from the instructional funds.

Moreover, none of the appropriations received under the Adams Act can be used for printing even the results of the Adams investigations, nor for administrative or clerical work, and the Hatch fund can be used only for strictly experimental work. In accepting these appropriations, the State is under obligations to provide the necessary buildings, land, etc. State appropriations required in the experimental work, therefore, whether for land, equipment, or other purposes, cannot consistently be charged against the students, nor against the College as an instructional institution. Neither are the funds provided for branch experiment stations, or for demonstration or other extension work throughout the state, a legitimate charge against the work in residence at the College, and should in no way be counted in estimating the requirements of the institution on the basis of student enrollment. In the development of the College in harmony with the spirit and policy of land-grant colleges, it must be made to serve the people in every way it can serve them, whether in the regular instructional work at the institution, or in the dissemination of information through extension agencies among the people in their respective communities, or in attacking and solving the different problems encountered in the development of the agricultural or other industries. But the funds required for each of these different activities should be charged to the particular line of work for which they are provided, and each considered from the point of view of the work accomplished and the value received.

Funds Should Be Considered According to Character of Work

Another factor that should be taken into account in considering the cost of instruction at the College is the fact that the work of the land-grant colleges is the most expensive kind of educational work. In addition to the regular instructional force and the library facilities required in the general subjects comprising the work of a liberal arts school, it is necessary in the technical courses distinctive of land-grant institutions, to provide special buildings,extended and expensive equipment, large tracts of land, and a much larger instructional force. There are the laboratories, shops, barns, orchards, gardens, farms, livestock, and many other features not found nor required in the general education work. Even the pure sciences taught in many institutions not offering technical courses require laboratory and other equipment much less elaborate and expensive than are required for work in applied science. There is also a corresponding increase in the cost of general maintenance.

Land-Grant College Work Most Expensive.

Some years ago, an investigation was made for the purpose of determining the approximate comparative cost of instruction per unit of registration in different lines of college work. For the purpose of this investigation, one hour of the students' time at college weekly during one-half year, in lecture or in recitation, together with the time necessary in preparation therefor, or a correspondingly longer period in shop, laboratory, field, or other exercises not requiring outside preparation, was regarded as a unit of registration. The cost was based upon the amount expended for salaries and other incidental expenses, but did not include buildings or other permanent equipment. The comparison, also, is between departments in the same institution, rather than in different institutions, in order that the institutional factors may be the same. The range of comparison runs about the same in different institutions. As an illustration, in the University of California, it was found that the cost per unit of registration in the departments of English, modern and ancient languages, pure mathematics, history, political science, etc., ranged from $1.94 to $2.86, and in the pure sciences, the cost ranged from $4.76 to $7.33, while in the applied sciences, including agriculture and mechanics, the cost per unit was from $7.95 to $16.80.

Cost of General and Technical Courses.

That agricultural college instruction is the most expensive kind of educational work is further shown by the fact that, according to statistics compiled by the U. S. Commissioner of Education, the cost per student in representative land-grant institutions is considerably greater than in the separate state universities. For instance: The total income from all sources for maintenance for each full-year student in the state agricultural colleges of Colorado, Iowa, Indiana, Kansas, and Washington, during the five years 1906-07 to 1910-11, inclusive, ranged from $134 to $320, the average being $227; while the total income from all sources for maintenance for each full-year student in the state universities of these states, during the same years, ranged from $115 to $191, the average being $155.

Comparative Institutional Cost.

One of the great problems in modern education is to get the institutions of higher learning on a businesslike financial basis. Any large industrial enterprise, if successful, outlines its policy for a term of years, and provides in its budget for all the different purposes according to the nature of the busi-

Permanent Support Necessary.

ness and the character and extent of its operations. An educational institution on its financial side should be regarded as a great business enterprise, and everything about it should be as strictly managed in accordance with up-to-date business principles as is any commercial institution. But this is impossible in a college or university that is dependent upon periodical appropriations for support. It is important that permanent funds be provided for the reason that it is necessary to know at least approximately for some time in advance what the income will be in order that definite plans may be made for the future. This would insure the highest standard of efficiency in the work, as well as the most advantageous and economical development of the plant.

Statutory Tax Levy Good Plan.

That this is generally recognized throughout the country is shown by the fact that many states are now making permanent provision in one way or another for the support of their educational institutions. The plan varies in different states, but the one generally agreed upon as the most satisfactory regulates the income by special statutory levy in the form of a mill tax upon the property of the State. In some states the tax provides funds for maintenance only, special appropriations being required for buildings and other improvements; while in others, the tax is for certain specific purposes, generally covering a limited period. In Iowa, for example, the State Legislature in 1911 made a special levy of one-fifth of a mill annually for five years for the construction and equipment of new buildings for the State College of Agriculture and Mechanic Arts. In 1909 the Legislature of California made a levy of three-tenths of one mill for the support of the University, with the requirement that one-fourth of the income derived therefrom during the first ten years should be used for buildings and permanent improvements.

An examination of recent reports of the United States Commission of Education shows that an increasing number of states are adopting the millage tax plan. In 1911 upwards of twenty state colleges and universities were receiving support from a state tax levy. The income from the state tax, however, is generally supplemented by special appropriations. For the year 1910-11 the tax levy for the support of higher education in ten states—California, Colorado, Indiana, Iowa, Michigan, Minnesota, Nebraska, North Dakota, Ohio, and Wisconsin—ranged from two-tenths of one mill to one mill on each dollar of tax valuation, the average being four and one-half tenths of a mill. In the aggregate the income from this tax was $4,753,550, or an average for each state of $475,355. The same institutions received for that year additional legislative appropriations aggregating $3,784,100, or an average of $378,,410 for each state.

Mill Tax Supplemented by Special Appropriation.

The Legislature of Illinois enacted a law in 1911, which is to go into effect in 1913, levying a tax of one mill on the dollar for the State University* In making this levy it was understood that the income derived therefrom should be adequate to meet all the requirements of the institution without additional legislative appropriations. So far as known, this is the only state depending entirely upon the tax levy, though in Michigan and Nebraska the educational institutions receive most of their income from the state tax.

Another plan that has many advantages is to provide special appropriations for particular purposes, extending over a period of years. The State Legislature of Wisconsin, for instance, in 1905, appropriated $200,000 annually for five years for buildings and equipment; in 1909 the period was extended from five to seven years. In 1901 Iowa appropriated $600,000 to the State College of Agriculture and Mechanic Arts for buildings and improvements, one-fifth of the amount to be used annually for five years. In 1907 the Legislature of Minnesota appropriated $175,000 annually for three years for engineering buildings. In 1909 this appropriation was extended from three to five years. California, in addition to the millage tax, made an appropriation of $1,000,000, one-tenth of which should

Special State Appropriation for Period of Years.

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*In Illinois the State University and the College of Agriculture and Mechanic Arts are combined in one institution.

be used annually for ten years. A modified form of this plan is followed in some states, whereby certain plans for buildings are approved and partial appropriations made for their construction. The State Legislature of New York, for example, passed a law in 1910 authorizing the College of Agriculture to contract for the erection of buildings to cost $357,000, and appropriated $200,000 for immediate use; the Legislature of Ohio approved plans for a library building to cost $250,000, and provided an appropriation immediately available of $125, 000.

One of the advantages of the millage tax plan is that it provides a permanent income that increases with the growth of the State. The disadvantage is that the increase in the income derived from the tax levy and in the student enrollment and institutional requirements may not run parallel, in which case the income from the tax would be either inadequate or unnecessarily large. To correct this difficulty, it is necessary either to modify the levy from time to time as occasion may require, or to provide supplemental legislative appropriations, or both. The millage tax is more successful in the older states where there is little fluctuation in the tax valuation of the state property or in the growth of the educational institutions. In the newer and rapidly growing states, however, where the conditions are more or less unsettled and there is lack of a definite policy of evaluating state property for taxation, this plan is less satisfactory. The uncertainty of depending entirely upon the tax levy in such states is indicated by the following: In the State of Washington the increase in the assessed valuation of state property varied during a period of three years from 7.75 per cent to 61.38 per cent, while for the same period the variation in student enrollment in the institutions of higher learning was from 25.5 per cent to 6.5 per cent.* The conditions are more fully indicated by the following summary:

Disadvantages of Millage Tax.

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*From "Statistics on Higher Education," published by the University of Washington in January, 1911.

	1904-05	1905-06	1906-07	1907-08	1908-09	1909-10
	%	%	%	%	%	%
Increase in assessed valuation of state property	7.75	10.08	61.38	8.1	30.5	5.4
Average increase in student enrollment in State University and Agricultural College	25.5	32.5	6.5	20	6	12

Income Inadequate or Too Large.

It will be observed that the average increase in the student attendance at the two institutions of higher learning in the State of Washington during the years 1904-06 was more than three times as great as the increase in the assessed valuation of state property, and during the years 1907-08 and 1909-10, more than twice as great. Had these institutions, therefore, been dependent upon a state tax for support, the income during these years would have been entirely inadequate. On the other hand, in 1906-07 the increase in the income would have been nearly ten times as great, and in 1908-09 more than five times as great, as the increase in institutional needs, based upon student enrollment.

Difference In Enrollment.

Another thing revealed by the statistics given in the Washington report is that the change in the enrollment of different institutions "is not alike for any year or period of years." It is shown, for example, that the increase in student attendance for the year 1906 was 29 per cent at the University and 36 per cent at the State College, while in 1907, the increase was 11 per cent and 2 per cent, respectively. The greatest extreme was in 1909, when the University had an increase of 16 per cent and the State College an actual decrease of 4 per cent.

In Oregon, also, as shown by a report prepared by the Board of State Tax Commissioners, the increase in the total assessed valuation of state property during the past ten years has varied all the way from 3 per cent to more than 64 per cent, while the records show no such variation in the growth and requirements of the educational institutions. The Commissioners estimate that the increase in the future should be about 4 per cent. The average annual increase in the enrollment of full-year students during recent years at the State Agricultural College has been 17 per cent, and the demand for the more advanced technical work requiring large additions to room and equipment as well as to instructional force, has increased even more rapidly than has the student enrollment. The need, morever, for technical and industrial education in Oregon will undoubtedly increase rather than decrease.

Conditions In Oregon.

The conditions mentioned are no doubt extreme, and will improve year by year, but they are sufficient to indicate the necessity of exercising great care in any attempt that might be made in Oregon to place the higher educational institutions upon a permanent and satisfactory financial basis.

NEEDS OF THE COLLEGE.

In the section of the Appendices giving an itemized list of the requirements for the next biennium will be found information in detail regarding the needs of the College for land, buildings, equipment, and general maintenance. In any growing, modern institution, particularly of the land-grant college type, whatever provision may be made for its development, the demands generally are in advance of the instrumentalities provided for the work. In the Oregon Agricultural College, notwithstanding the appropriations made by the last State Legislature for new buildings, additional instructors, equipment, and other improvements, there is present urgent need throughout the institution for an enlargement of the material facilities and of the instructional force. To insure efficiency, there must be ample room, adequate equipment, and a strong, competent faculty. The new buildings constructed during recent years have all been planned so as to furnish the maximum amount of room with the available funds. They are also well adapted to the needs of the departments for which they have been provided. But the demand for room has increased so rapidly that

Enlargement of Facilities Required.

the capacity of new buildings has generally been exceeded before they were ready for occupancy. The appropriations for buildings, in fact, have never been adequate. On account of the failure of the State Legislature, four years ago, to grant the request of the Board of Regents for an appropriation for a horticultural building, the growth of the College has been to that extent in advance of the ability of the institution to meet the requirements for room. A building plan had been carefully prepared, anticipating the needs of the College for a number of years; and, had the Horticultural Building been provided at that time, appropriations could consistently have been made two years ago not only for the additional departmental buildings required, but also for a library building. Then, with corresponding appropriations for the buildings needed during the next biennium, the development of the College plant would have been more nearly commensurate with the needs of the institution. But as it is, it would seem impracticable to secure at the present time the legislative appropriations required to meet even the imperative demands for additional room.

Building Appropriations Inadequate.

That the requests of the College for buildings have been conservative, is shown by the fact that during the past four years the amount annually received for this purpose has averaged about $65,000, and the cost of the most expensive building has been approximately $50,000. The significance of these figures will become more apparent if compared with the amounts expended for buildings by other similar institutions. Washington State College, for example, has recently been provided with a fire-proof library and auditorium building, the cost of which was $130,000, and a fire-proof recitation building costing $125,000; besides a number of other buildings, including a hydraulic laboratory, a veterinary hospital, a domestic science building, etc.* In Iowa, although there had recently been completed an admin-

Buildings Furnished Other Colleges.

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*The growth of the Oregon Agricultural College has been much more rapid during recent years than has that of the Washington State College; and it has a greater present total enrollment, as well as a larger number of regular full-year students. There is corresponding need for more room and other facilities.

istration building costing $375,000, an agricultural building costing $350,000, and engineering buildings costing $301,000, the state legislature in 1911 provided a tax levy of one-fifth of a mill annually for five years for the construction and equipment of new buildings; and at the same time made special appropriations for buildings aggregating $356,000, including $225,000 for a library.** Kansas, also, and, in fact, all of the leading land-grant institutions of other states, have expended much larger sums for buildings, not only in the aggregate, but in proportion to student enrollment, than has the Oregon Agricultural College.

College Policy Conservative.

Reference to these facts is not made in an unappreciative spirit, or for the purpose of unfavorable comparison—because the population and wealth of Oregon would not justify a duplication of the appropriations of such states as Iowa and Kansas—but rather for the purpose of indicating the conservative policy that has been pursued by the Oregon Agricultural College in its requests for legislative appropriations, and of emphasizing the absolute necessity of providing additional room as rapidly as possible.

In his report four years ago, and again in 1911, the President urged the great need for a library and auditorium. As a matter of economy, it was thought at the time that these might be provided for in the same building. The growth of the institution since, however, would indicate the desirability of having a separate building for each. Should appropriations be made for a new men's gymnasium, the main floor of this building might be used temporarily for convocations and other general assemblies, thereby obviating the necessity of providing for a new auditorium building at this time. There is pres-

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**The enrollment of full-year students in the Iowa State College, for the year ending June 30, 1912, was 1,648, or 30 per cent greater than the full-year enrollment in the Oregon Agricultural College. The total enrollment, however, including students in winter short courses and in the summer school, is greater in the Oregon Agricultural College by 14 per cent than in the Iowa State College.

ent urgent need, however, as emphasized in other sections of this report, for a library building. Reference has already been made to the fact that the books and pamphlets in the Library now number more than 55,000, and are stored in five classrooms on two different floors of the Administration Building, while the reading room has a seating capacity of 108. Under such conditions it is evidently impossible even to attempt properly to serve a college community numbering at times upwards of 2,000 people. As stated by the Librarian, "From every point of view of storage and service, it will be seen that a new building in which to house the Library is an imperative need." And yet, on account of the necessity of using any appropriations that might be obtained at this time in providing buildings required for laboratory and other work, for which provision cannot otherwise be made, it would seem unavoidable that request for a library building be again deferred for another biennium.

Library Facilities Inadequate.

Other buildings which are badly needed, and for which appropriations should be secured as soon as practicable, include a men's gymnasium, a home economics building, an agricultural auditorium or lecture hall, women's dormitories, an auditorium, a physics laboratory, a forestry building, a veterinary laboratory, and a poultry building, besides a number of small structures such as greenhouses, barns, and shop and seed storage buildings.

Other Buildings Needed.

The buildings for which appropriations should be received at this time, in order to insure reasonably efficient work, are as follows:

HOME ECONOMICS BUILDING. The necessity for this building and the estimated cost are explained on page XLIX. The building is planned in three divisions, consisting of a central or administration building, and two wings. The central building will be used for offices, classrooms, school library and reading room, a model cottage, and an auditorium and banquet hall. The wings are planned especially for the two principal divisions of the work, one for domestic science and the other for domestic art. On completion of this building the rooms in the agricultural buildings now occupied by the departments of Domestic Science and Art will be vacated and become available for agricultural work, thereby relieving the congestion in the departments of Agronomy, Bacteriology, Botany and Plant Pathology. As estimated by the architects, the building completed will cost approximately $150,000. One wing and the central building are badly needed. The domestic science section, at least, should be provided for at the present time. This will cost, with equipment, $60,000.

MEN'S GYMNASIUM. This building is to occupy a place just west of Waldo Hall, near the athletic field. It will be approximately 280 feet by 96 feet, constructed of reinforced concrete, the plan being similar to that of the new Armory. On completion of this building the present Gymnasium will be available for the exclusive use of women. It is planned to use the main floor of the new Gymnasium temporarily for convocation and general College assemblies. The total cost of the building is estimated at $75,000. Should it be impracticable to procure this amount at the present time, the walls and roof can be completed, and sufficient work done on the main floor and in one or two locker rooms to permit their use, for between $40,000 and $50,000.

FORESTRY BUILDING. The Forestry Building, planned for the accommodation of the present work and with room for the logging engineering courses, will have extreme dimensions of 180 feet by 100 feet. It will contain laboratories for logging equipment, commercial woods, forest pathology, forest entomology, wood distillation, wood preservation, etc., in addition to the rooms required for offices, class work, drafting, and a museum. The total cost of this building, with equipment, will be from $65,000 to $75,000. As in the case of the Home Economics Building, if necessary one or two sections of this building can be completed at this time at a cost of from $30,000 to $50,000.

VETERINARY BUILDING. On pages 27 and XXXVI will be found an explanation of the necessity of providing a new building for the veterinary work, in which suitable provision can be made for the special laboratories and other facilities required. The removal of the veterinary work from the Central

Agricultural Building will provide additional room needed by the Extension Department. The proposed building, constructed of brick and stone, two stories in height, will cost approximately $15,000.

ANIMAL HUSBANDRY BUILDINGS. For the proper care of the College livestock and for the accommodation of animals loaned to the institution for instructional purposes by various breeders of the State, it will be necessary to provide the following buildings: A stock barn and an implement house for the College Stock Farm, the estimated cost of which is $3,000; and a stock barn near the Judging Pavilion, to cost, with scales and other equipment, about $6,000. There is also need for a seed house for the Agronomy Department in which suitable room can be provided for the storage and preservation of valuable seeds required in experimental work. The estimated cost of the building is $1,500. As a matter of economy, however, part of the stock barn can be used temporarily for the preparation and storage of seeds, thereby obviating the necessity of asking for an appropriation for this building at the present time.

SHOP BUILDINGS. Two small buildings are required, one for the storage of shop supplies, including lumber for the Woodworking Department, and coke, scrap iron, and flasks for the foundry; and the other for the storage of paints, oils, benzine, and other inflammable materials. The estimated cost of these buildings is $2,150.

GREENHOUSES. For the departments of Agronomy, Horticulture, Entomology, and Botany, a number of additional glass houses are required. Some of these departments have been seriously handicapped for several years for want of greenhouse space. The estimated cost of the buildings required is $6,250.

SPECIAL IMPROVEMENTS. With the appropriation provided by the State Legislature in 1909, two units of the building for the new heating plant were constructed; one 250 H. P. boiler was installed, and a tunnel built from this plant to a point directly in front of the center of the Agricultural Building.

Heating Plant.

As explained under "Buildings and Improvements," page XXIX, an additional boiler has been installed during the past year, but the capacity of the plant is still inadequate to heat the buildings with which it is now connected. The old plant provides heat for the Administration Building, the Mechanical Hall, the Shops, and the new Mines Building. All the other buildings are dependent upon the new heating plant. For want of funds, however, the Stock Judging Pavilion and the Farm Mechanics Building have not been connected with this plant. The cost of providing an additional unit, including the construction of the building, the installation of the boiler, the extension of the conduits, etc., as explained on page 112, will cost approximately $26,000. By omitting the building and placing the boiler in the space originally intended for the shop and dynamo room, the total cost of these improvements may be reduced to $21,000.

Additional Unit Required.

It will be necessary to remodel Science Hall in order to provide suitable room for the work in pharmacy and chemistry. This building was constructed in 1902, being planned for the accommodation of the different departments of agriculture, including dairying, chemistry, bacteriology, forestry, botany, zoology and entomology, and for the experiment station offices and laboratories. With the removal of the departments of agriculture, zoology, botany, and bacteriology, into the new buildings provided therefor, it has been necessary on account of the additional laboratory and other facilities required for the work in chemistry, to use many of the rooms in this building for purposes entirely different from those intended at the time the building was constructed. All the room in this building will now be required for the work in the departments of pharmacy and chemistry; but to adapt the building to the needs of these departments it will be necessary to make a number of changes. As originally planned, the stairways were built in such way that some of the interior rooms are entirely dependent upon borrowed light. The top floor, furthermore, has always been used as a sort of museum for the storage of the orni-

Remodel Science Hall.

thological collection, which will now be transferred to the agricultural buildings. It will be necessary to construct a new stairway from the first floor to the fourth; to change a number of partitions on the second and third floors; to divide the fourth floor into various rooms required for laboratory and other work in pharmacy, and to provide them with additional light; to overhaul the heating system; and to furnish the plumbing equipment required in the various laboratories throughout the building. The estimated cost of these improvements is $11,205.

IMPROVEMENTS AND REPAIRS. It will be necessary to make a number of miscellaneous improvements during the biennium. These are listed in detail in the Appendices. Among the more important items are the following: To extend the water mains and provide hydrants for fire protection, to drain the athletic field and other parts of the campus in the vicinity of buildings, and to improve walks and drives. A great deal of repair work will also be required, particularly in the older buildings. This will include such items as painting roofs, repairing stairways and floors, replacing old steam pipes, painting woodwork, glazing, etc. The estimated aggregate cost of the miscellaneous improvements and repairs, as revised, is $35,000.

EQUIPMENT. The necessity for large additions to the equipment of the several departments has been emphasized in the different reports of the Deans and referred to on preceding pages of this report. These include the completion of the equipment for the ceramics laboratories and other rooms in the new Mines Building, the installation of the cold storage plants in the Horticultural and Dairy buildings, the completion of the equipment required in the different dairy laboratories, and the purchase of livestock, besides the general and miscellaneous equipment required by the different departments, particularly in the technical and scientific laboratories throughout the institution. The aggregate cost of the equipment as estimated by the heads of departments and listed in the Appendices, is $114,912. These estimates, however, have been carefully revised by the Deans and the President, and finally reduced to $60,000.

BOOKS AND PERIODICALS. For the purchase of books and periodicals, as required by the various departments throughout the institution, there should be an appropriation for the two years of at least $15,000.

COLLEGE EXTENSION. To organize the College extension work in agriculture and home economics, as outlined on pages 93-107 and XLV, with the necessary instructors and office force, including salaries, traveling expenses, supplies and equipment, would require an annual appropriation of at least $25,000.

EXPERIMENT STATION. For the establishment of a poultry breeding plant, as explained on page XL, the total cost of the land, buildings, and equipment required, is estimated at $12,000. This plant, when once established, will be self-sustaining, the income from sales being sufficient to meet the expense of maintenance.

Poultry Breeding Plant.

There is great demand for experiment station publications. As explained on page XLIV, some of the experimental appropriations cannot be used for printing. In order to provide funds for the publication of station bulletins in sufficient number to supply those on the mailing lists, there should be an annual state appropriation of $5,000.

Station Publications.

MAINTENANCE. In any growing educational institution the greatest need is undoubtedly for an increasing maintenance fund. With the increase in student enrollment comes a demand for additional instuctors, buildings, improvements, and other facilities, with a corresponding increase in the requirements for janitorial service, heat, electric light and power, water tax, maintenance of grounds, clerical help, etc. One of the greatest needs of the Agricultural College is for additional instructors. It will also be necessary to make some provision for increasing the salaries of a number of the present members of the faculty. Information in detail regarding the requirements for salaries and miscellaneous maintenance will be found on pages 178 and 183. These estimates, as revised, may be summarized as follows:

Additional professors, instructors, and assistants		$ 42,730
Increase in salaries of present employees		16,750
Present salaries, including all members of the faculty, officers of Board of Regents, clerical help, etc.		174,590*
Miscellaneous maintenance, including heat, electric light and power, maintenance of campus, janitorial service, night watchman, printing and advertising, traveling expenses, telephone and telegraph, water tax, etc.		60,250
Total maintenance requirements for one year		$294,320
LESS INCOME.		
Interest land-grant fund, Morrill Act of 1862	$ 11,500	
Federal Acts, 1890 and 1907	50 000	
Miscellaneous receipts	10,000**	
State appropriation	150,000	222,400
Annual maintenance requirements in excess of present income		$ 71,920

The requirements for maintenance in addition to the present income include $59,480 for salaries and $12,440 for miscellaneous maintenance. Since the items comprising the latter include only fixed charges and cannot be reduced, any further reduction in the above estimates could be made only by reducing the number of instructors or the amount allowed for increase in present salaries. A careful examination of conditions at the College will show that the number of instructors should be increased rather than diminished, and that the salaries now paid the deans of schools, heads of departments, and a large number of other faculty members, are much lower than the same service would command in other similar institutions. In this connection it should also be noted that the demand for technical education, particularly in different lines of agriculture and home economics, is increasing so rapidly that other and wealthier institutions are bidding up in salaries in order to procure competent men and women for the most responsible positions. Under such conditions it cannot be expected that the Oregon State Agricultural College can retain its strongest faculty members without approximating at least the salaries offered by other institutions. Any further reduction in the above estimates, therefore, must unavoidably result in a corresponding impairment of the efficiency of the work of the institution.

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*Does not include salaries paid from Experiment Station funds; neither does it include janitors or others provided for in Miscellaneous Maintenance.

**Laboratory, shop, gymnasium, and other similar fees are not included here for the reason that they are used for the purchase of material required by students in their laboratory and other work, the cost of which is not included in the estimates of requirements.

Respectfully submitted,

W. J. KERR,

President of the College.

January 6, 1913.

APPENDICES.

1—Report of the Dean of the School of Agriculture.

2—Report of the Dean of the School of Domestic Science and Art.

3—Report of the Dean of the School of Engineering.

4—Report of the Dean of the School of Commerce.

5—Report of the Professor of Forestry.

6—Report of the Professor of Pharmacy.

7—Report of the Professor of Industrial Pedagogy.

8—Report of the Professor of Physical Education for Men.

9—Report of the Professor of Physical Education for Women.

10—Report of the Dean of Women.

11—Report of the Director of College Extension.

12—Report of the Librarian.

13—Report of the Registrar.

14—Report of the Director of the Experiment Station.

15—Report of the Superintendent of Heating.

16—Report of the Superintendent of Light and Power.

17—Financial Reports, including the Report of the College Treasurer.

18—List of Employees and their Salaries for the Year Ending June 30, 1912.

19—Changes in Faculty: Resignations, People Employed, and Leaves of Absence.

20—Departmental Estimates of Requirements for the Biennium, July 1, 1913, to June 30, 1915.

REPORT OF THE DEAN OF THE SCHOOL OF AGRICULTURE

To the President of the College:

Sir: I am pleased to report that the phenomenal growth of the School of Agriculture, to which reference was made in my reports for 1908 and 1910, has continued throughout the present biennium.

This is shown in many ways—by a remarkable increase in the number of students; by the completion of several new and much needed buildings, which are already crowded to the limit; by the increased efficiency which has been made possible by the completion of these buildings and by the installation of new equipment; by an increase in the Winter Short Courses; and by the continual increase in the demand for our graduates.

It should also be noted that greater efficiency has been attained by a thorough revision of the various courses. While the revision was undertaken for the specific purpose of adapting the work in these courses more perfectly to the special needs of our own students and of the State, and was completed before the Eighth Report of the Committee on Methods of Teaching Agriculture, of the American Association of Agricultural Colleges and Experiment Stations, was received, it is interesting, nevertheless, to note the remakably close correspondence between our revised courses, which went into effect at the beginning of the present school year, and the tentative course which was suggested by that Committee after studying the courses which are offered at the leading colleges and universities of the land. It is believed that with certain minor changes which it is hoped may be made effective in the near future, our degree courses in Agriculture are not surpassed elsewhere and in some lines of work they are not equalled.

EXTENT AND CHARACTER OF THE WORK

The varied Agricultural activities of the College are grouped under three subdivisions, viz: College Instruction, Research, and Extension work. Since each of the members of the Agricultural faculty is engaged, for the most part, in all three of these fields, there is necessarily some difficulty in determining accurately the boundaries of any one of them. In a general way, however, the instructional work is offered through the medium of the following courses:

(1)	Secondary Course in Agriculture	(2 yrs.)
(2)	Degree Course in General Agriculture	(4 yrs.)
(3)	Degree Courses in Agronomy	
	(3a) Regular Agronomy	(4 yrs.)
	(3b) Soils, Specialized Course	(4 yrs.)
	(3c) Crops, Specialized Course	(4 yrs.)
	(3d) Rural Engineering, Specialized Course	(4 yrs.)
(4)	Degree Course in Animal Husbandry	(4 yrs.)
(5)	Degree Courses in Dairy Husbandry	
	(5a) Milk Production	(4 yrs.)
	(5b) Dairy Manufacture	(4 yrs.)
(6)	Degree Courses in Horticulture	
	(6a) Pomology	(4 yrs.)
	(6b) Olericulture	(4 yrs.)
	(6c) Floriculture	(4 yrs.)
	(6d) Landscape Gardening	(4 yrs.)
(7)	Degree Course in Poultry Husbandry	(4 yrs.)
(8)	Degree Course in Agricultural Chemistry	(4 yrs.)
(9)	Degree Course in Agricultural Bacteriology	(4 yrs.)
(10)	Degree Course in Entomology	(4 yrs.)
(11)	Degree Course in Plant Pathology	(4 yrs.)
(12)	Short Dairy Course	(1 semester)
(13)	Winter Short Course in Agronomy	(4 weeks)
(14)	Winter Short Course in Animal Husbandry	(4 weeks)
(15)	Winter Short Course in Horticulture	(4 weeks)
(16)	Winter Short Course in Dairy Husbandry	(4 weeks)
(17)	Winter Short Course in Poultry Husbandry	(4 weeks)
(18)	Winter Short Course in Crop Pests	(4 weeks)
(19)	Agriculture for Teachers, Summer School,	(6 weeks)
(20)	Farmers' Week	(1 week)
(21)	Movable Schools; exhibits and judging at fairs; correspondence; miscellaneous lecures, etc., under the auspices of the Extension Department.	

The Secondary Course.—There is a tendency on the part of some to criticize unfavorably this institution for offering courses of secondary grade. It is held that this tends to attract to the College a class of immature, poorly prepared students who would be much better off in attendance upon their respective local high schools, and that their withdrawal from the high school ranks retards the development of these schools.

There is some slight justification perhaps for this criticism, and personally I should prefer to have the Secondary Course in Agriculture discontinued if this were feasible. However, I do not believe it is advisable at present. There is altogether too urgent need of trained men to develop the

Agricultural wealth of the State and altogether too little opportunity for young men to obtain the necessary training. The Secondary Course is not popular. It is the only one of the Courses mentioned above in which the registration has not greatly increased during the past four years. It is my observation that young men do not leave their local high schools to enter our Secondary Course merely to be "in College." They are here because their parents are willing to incur the necessary additional expense that they may obtain something which they desire, something which could and should be provided by their local high schools, but which these schools have so far mostly failed to provide, viz: the opportunity to obtain some special training for their life's work on the farm. Whenever any considerable proportion of the high schools of the State prepare their pupils for the actual everyday affairs of life, rather than for entrance to college or university, the problem of our Secondary Courses will be solved.

For the present, therefore, I believe that our Secondary Course in Agriculture fills a distinct need. It offers to earnest young men who have been denied the privilege of high school training, the opportunity to obtain a working knowledge of some of the principles of Agricultural Science and practice. The technical instruction given in this course includes elemental courses in Agronomy, Animal Husbandry, Veterinary Practice, Horticulture, Dairy Husbandry, Bacteriology, Shopwork, Accounting and Business Methods, Commercial Law, Drawing, Woodwork and Blacksmithing. Courses in English, Mathematics, and History are provided so that students who finish this course, and who so desire, may be fully prepared to enter upon the Degree Courses.

The comparative registration in this course during the past five years is shown in the following summary:

	1908-09	1909-10	1910-11	1911-12	1912-13
First year	37	34	31	21	35
Second year		30	26	28	27
Total	37	64	57	49	62

The Degree Courses.—The efficiency of the Degree Courses has been increased during the biennium by the general revision to which reference has already been made; and by the addition or substitution of a considerable number of new courses of instruction. All of the courses of instruction above the secondary grade which are now offered, are listed below Those which have been added or substituted during the biennium are printed in black face type and the work is briefly described. For convenience the courses are arranged by departments.

Agronomy Department.

	Semesters	
	1st.	2nd.
101 Basic Agronomy	3	
102 Soil Physics		5
103 **Soil Physics.** Elective. Similar to 102, but shorter, deals with more important phases of subject. Designed as elective for Agricultural students unable to take regular course in Soil Physics.		3
104 Soil Fertility		
111 **Advanced Soil Work.** Elective. The study of various soil types of Oregon through mechanical analysis, and other physical tests; work in soil surveying and mapping; or through wire baskets, pot culture, and field plot tests may determine the effects of various systems of cropping, or fertilizing, or of soil bacteria, upon soil fertility.		
201 Crop Production		3
202 Cereal Crops	3	
203 Forage Crops	2	
204 **Crop Improvement.** Deals with practical problems of improvement of quality and yield of more important field crops. Different systems of breeding and general principles of selection briefly discussed best planting and cultural methods of breeding plots studied. Work largely in laboratory and field.		
206 **Advanced Crop Breeding.** Study of laws, theories, and known facts concerning heredity, variation and evolution in plant life. Causes of variation, behavior of characteristics in transmission and possibility of inducing stability of character and establishing desirable types, will be discussed with special reference to field crop improvement.		
211 **Advanced Crop Work.** Complete study of some special crop. Methods of field experimentation may be compared and carried out; plant breeding theories and their practical use in com-		

mercial seed production may be made subject of investigation, or preparation for seed testing expert. Special lectures on the following subjects: Potatoes; Sugar Beets; Hops; Legume Seed Production		1-5
301 Drainage and Irrigation		3
302 **Irrigation Farming.** Methods of obtaining, distributing, and conserving irrigation waters. Handling of different crops under irrigation. Cost and profits and duty of water in various districts of Oregon. Water rights and irrigation codes. Studies of irrigable soils, laying out of irrigation systems, field examination of some of largest projects in the State.		
303 Climatology		3
304 **Drainage Engineering.** Study of drainage problems and conditions in the field. Actual surveying, laying out, drafting of plans, estimation of cost and installation of systems at different points in the State		3
311 **Advanced Drainage and Irrigation Work.** Special problems in such subjects as drainage of alkali lands, drainage against seepage, study of water table fluctuations, etc., or field studies of the irrigation of a certain crop region, conservation of irrigation waters, effect of irrigation on soil moisture conditions, etc.		
401 Farm Mechanics	3	
402 Farm Power Machinery		3
403 **Farm Motors and Power Machinery.** Investigation of latest improvements and possibilities in the motors and power machinery used on the modern farm. Comparative tests of farm stationary and traction engines and power machines.		
404 Farm Structures		
411 **Advanced Farm Mechanics.** Testing efficiency of farm power machinery and engines; designing complete series of farm buildings; becoming experts on		

harvesting machinery.		
501 **Weed Eradication.** Deals with methods of exterminating the more noxious or persistent weeds common to the United States, and particulary to Oregon	1	
502 **Dry Farming.** Study of principles of moisture conservation. Special tillage methods and machinery. Dry farming crops and rotation. Occurrence and phases of the industry in Oregon, and field excursions to the dry farming section		3
503 **Seminar.** Preparation and discussion of papers of special Agronomic interest. Different phases of the science at home and abroad	1	
504 Seminar. Similar to 503	1	
505 Farm Management		3
511 **Advanced Farm Management.** Advanced study of different farming systems or the management of special types of farming, such as dry land or irrigated areas, swamp or dyked lands etc.		2-5 2-5
Animal Husbandry Department.		
1 Stock Judging		2
2 Live Stock Management		2
3 Breeds of Stock	4	
4 Breeds of Stock		4
5 Live Stock Marketing	3	
6 Principles of Breeding	5	
7 Principles of Stock Feeding	2	
8 Beef Production		1
9 Mutton and Wool Production		1
10 Pork Production		1
11 Milk Production		1
12 Horse Feeding		1
13 Research work (Credits to be arranged)		
13 Research work (Credits to be arranged)		
14 Animal Husbandry Literature	1	
17 Advanced Stock Judging		2
18 Seminar	1	
19 Seminar		1
Dairy Husbandry Department.		
1 Farm Dairying. Composition of Milk.		

	Application of Babcock test to milk and milk products; selection of dairy breed; farm dairy appliances; disposal of product; churning, packing, and marketing butter; farm cheese making; utilization of dairy by-products		3
2	Dairy Inspection Application of Babcock test; use of lactometer in detecting adulterations; rapid tests for various preservatives and adulterations, the score card system of dairy inspection; judging of butter, cheese and other dairy products		2
4	**Dairy Farm Equipment.** Plans and specifications for dairy barns, milk houses and other farm buildings. Kind and number of animals for a given area. Dairy machinery and appliances required, and installation of the same		3
5	**City Milk Supply.** Problems concerning production and distribution of milk for town and city retail trade. Production of "certified milk." Pasteurization as applied to market milk		2
6	**Seminar.** Study of new experiment station bulletins, books and general dairy periodicals. Problems of dairy manufacture and milk production.		
7	Dairy Herd Management		3
9	Thesis		2
10	Advanced Butter Making	5	
11	Cheese Making		3
12	**Dairy Machinery.** Theory and construction of steam boilers and engines: refrigerating machinery; separators, ripeners and pasteurizers. Practice in Engineering Shops.		
13	Factory Management	3	
14	Technology of Milk		2
15	Ice Cream and Ices		1
16	Home Dairying		2

Horticulture Department

1	Plant Propagation		2
2	Orchard and Garden Practice	3	
3	Floriculture	2	
4	Landscape Gardening		2
11	Practical Pomology	3	

12 Orchard Practice	2	
13 Orchard Practice		2
15 Grape Growing		2
16 Small Fruit Culture		3
17 Nut Culture		2
18 Systematic Pomology	3	
19 Commercial Pomology	2	
20 Seminar		1
22 History and Literature of Horticulture		2
23 Plant Breeding	3	
24 **Advanced Plant Breeding.** Practical problems of plant breeding. Largely a laboratory course in greenhouses, orchards and gardens.		
25 **Sub-Tropical Pomology.** Study of culture of subtropical fruits, such as oranges, figs and olives	2 2	
26 **Advanced Pomology.** Finishing course in Pomology. Lectures dealing with such subjects as fruit soils, pruning, orchard fertility, pollination, irrigation, and a review of the season's market reports and lessons they teach. The latest development of Horticulture as shown in bulletins, reports, etc.		3
31 Principles of Vegetable Gardening	3	
32 Forcing Vegetables		2
33 **Forcing Vegetables.** Forcing such vegetables as lettuce, cucumbers, tomatoes, rhubarb and melons, in cold-frames, hot-beds and green-houses.		
34 Systematic Olericulture	1	
35 Truck Gardening	3	
36 Commercial Truck Gardening		3
37 **Practical Vegetable Growing.** Practicums in field and greenhouse, supplemented by lectures; all commercial garden crops to be handled from seed time on in such a way as to give the student a thorough working knowledge of growing leading vegetable crops.		
41. Annuals and perennials	3	
42. **Annuals and Perennials.** Study of culture and value of hardy annuals and herbaceous plants and their use in Floriculture		3
43 Plant Materials	2	

44 **Plant Materials.** Study of plants in both active and dormant conditions.		
45 Theory and Design	3	
46 Theory and Design		2
47 Field Practice in Landscape Gardening		
51 Greenhouse construction		2
52 Forcing Flowers	3	
53 **Forcing Flowers.** Study of propagation problems of culture, such as soils, ventilation, and heat connected with forcing of plants used in florists' trade		3
54 Floriculture	2	
55 Landscape Gardening		2
56 Vegetable Gardening and Small Fruit Culture		3
Poultry Husbandry Department.		
1 Poultry Husbandry	5	
2 Poultry Husbandry		5
3 **Poultry Husbandry—Advanced Work.** Original investigation and demonstration testing new methods, conducting experiments, and writing up the results.	5	
4 **Poultry Husbandry—Advanced Work.** Continuation of 3		5 5
5 **Poultry Husbandry.** Selection of stock; housing of flocks; methods of hatching and reproducing the flock; feeds and methods of feeding; markets and methods of marketing.		
Veterinary Science Department.		
1 Comparative Anatomy	3	
2 Veterinary Physiology		3
3 Materia Medica and Comparative Medicine	3	
4 Surgery		3
5 Histology (Credits and hours by arrangement)		3

Bacteriology Department.

In this department a complete change of faculty has occurred during the biennium, and the courses of instruction have been completely revised. As given at present they are as follows:

101 **Elementary Bacteriology.** Lectures and laboratory demonstrations to familiarize students with underlying principles as applied to everyday life,

and as an introduction to more advanced courses in the subject	3	
111 General Bacteriology. Laboratory work familiarizing students with special bacteriological apparatus and its use.	5	
112 Advanced Bacteriology. Continuation of 111		5
114 A Two-Hour Lecture Course. For students who have been unable to take the first term lecture work		2
116 Research in Bacteriology. Research in Veterinary, Domestic Science, or Pharmaceutical bacteriology; Work for Master's Degree may be selected.		2
201 Pharmacy Bacteriology. Lectures and laboratory work dealing with the medical aspects of Bacteriology	4	
202 Pharmacy Bacteriology. Elemental chemical diagnosis, classification of bacteria, qualitative determinations.		
203 Clinical Bacteriology. Practice work in ordinary methods of clinical diagnosis in use. Typhoid, tuberculosis, various pus formations, bacteriological examinations of urine and feces, blood counting and differentiation into its elements; and dark ground illuminations.	2	
204 Clinical Bacteriology. Continuation of 203.		2
205 Immunity and Vaccine Theraphy. Study of methods in vogue in various immunity and therapeutic reactions such as anti-toxin formation, preparation of vaccines, the precipitin technique and standardization. (Credit to be arranged.)		
300 Domestic Science Bacteriology. Bacteriology in its relation to home life; sanitation as it concerns the house, covering such subjects as waste supply, action of septic tanks, control and prevention of specific diseases, vinegar making, etc.		4
301 Sanitary Bacteriology. Methods of sanitary bacterial examination in vogue for water, milk, butter, cheese, meat,		

air, etc. Simple chemical methods. Use and action of antiseptics and germicides and methods of efficient fumigation		3
302 **Zymology.** Microscopic structure of yeast plant studied, the preparation and and manipulation of special media designed for the growth of yeast, pure cultural methods used in Zymology, methods of laboratory testing of commercial yeasts both for bread making and alchoholic production, the bacteriology of salt-rising bread	2	
401 **Dairy Bacteriology.** Source of bacteria in dairy products, methods of control, usefulness of certain varieties, special media for milk, etc., examination, methods of milk examination	3	
402 **Dairy Bacteriology.** Economic use of pure cultures of micro-organisms in buttermaking; methods of perpetuating pure cultures for starters; controlling flavor of cheese by use of pure cultures of selected organisms; enzyme activities; laboratory exercises in demonstrating pathogenic bacteria in milk, butter, cheese, lencocyte demonstrations.		2
22 History and Literature of Horticulture		2
23 Plant Breeding	3	
24 **Advanced Plant Breeding.** Practical		
403. Dairy Half-Year Course. Intensely practical. Methods of milk contamination and methods of prevention, use and propagation of starters, milk inspection, flavor and curing of cheese	3	
501 **Agricultural** Bacteriology. Micro-organic life in the soil in its various activities, such as the destruction of organic matter, humus formation, various nitrogen changes, and, especially, nitrogen fixation by legume bacteria. Technique of soil inoculation	3	
502 **Agricultural Bacteriology.** Special soil changes, such as ammonification, denitrification, non-symbiotic nitrogen fixation, sulphur combinations, the effect of various methods of tilth on bacterial soil activities		4

660. **Water and Sewage Bacteriology.** Bacteriology of water supplies, sewage and sewage disposal according to the standards and methods of the American Public Health Association		2

Botany and Plant Pathology Department.

20 Principles of Botany	3	
21 Principles of Botany		3
30 **Forest Botany.** Microscopic structure of wood and of the morphology of Gymnosperms and Agiosperms. Practice in identification of trees and other plants of interest to the Forester	3	
31 **Forest Botany.** Continuation of No. 30.		3 3
41 Agricultural Botany		3
45 Taxonomic Study of Farm Weeds and Grasses.		2
50 Plant Physiology	3	
51 Plant Physiology		3
60 **Commercial Botony.** Arranged to meet the needs of students in commerce. Commercial plants of the world	3	
70 Pharmaceutical Botany	3	
71 Pharmaceutical Botany. Special study of structural Botany and clasification of drug producing plants		3
80 Seminar	1	
81 Seminar		1
82 Research and Thesis		1-5
100 Principles of Plant Pathology	3	
102 Diseases of Tree and Small Fruits		3
104 **Embryology and Histilogy.** Origin		
106 Forest Pathology	4	
110 Phytopathological Technique. Methods of investigations in Plant Pathology, which include methods of keeping records; care of collections; culture work; inoculation; infection and photography.		3
112 **Phytopathological History.** Histological modifications of plant tissues resulting from disease		3
115 **Advanced Taxonomy of Parasitic Fungi.** Advanced work on Toxonomy and Phylogeny of plant disease producing organisms. Practice in identification of unknown forms. Collection, properly		

prepared for herbarium, required		3
Agricultural Chemistry Department. The department of Chemistry is not included in the School of Agriculture, but the following work in Agricultural Chemistry is provided for Agricultural students:		
503 **Dairy Chemistry.** Study of chemistry of milk and its products including both qualitative and quantitative determination of adulterants and preservatives.		3
503 **Soil Chemistry.** Methods of soil analysis, as used by different experiment stations.		4
504 **Soil Chemistry.** Continuation of No. 503		
505 **Agricultural Analysis.** Analytical methods applied to Agricultural materials including cereals, fertilizers, soil, waters, etc.	4	
506 **Agricultural Analysis.** Continuation of No. 505	4	
507 **Advanced Agricultural Analysis.** Thesis work in Experiment Station laboratory, or work of same general description.	4	
508 Advanced Agricultural Analysis. Continuation of No. 507		4
Zoology and Entomology Department.		
101 Zoology	3	
102 Zoology		3
103 Zoology	3	
104. **Embryology and Histology.** Origin and development of individual body; elementary structures of adult organs and tissues. Study of such typical vertebrates as the chicken and the pig with reference to other domestic animals and man. Practice in mico-technique, such as killing, fixing, imbedding, sectioning, staining, and reconstruction from serial sections. Is adapted to those intending to study Veterinary Science or medicine as well as for general students	3	
105 **Embryology and Histology.** Continuation of No. 104		3
106 Game Propagation	1	

107 Ornithology. Lecture and field study of common birds of Oregon; course aims to develop an interest in native birds, their habits and haunts, with particular reference to their usefulness		1
201 Physiology and Anatomy	3	
202 Physiology and Anatomy	3	
203 **Physiology.** Chief functions of human body and laws of human health falling naturally within its province	4	
204. **Physiology and Hygiene.** Functions and care of human body in every-day life. Study of gross anatomy and histology of various tissues and organs of mammals.		2
205 **Advanced Physiology.** Deals with processes of digestion, absorption, nutrition and excretion		
301 Introductory Entomology	3	
302 Entomology of Orchard and Small Fruits.		2
303 Entomology of Truck and Field Crops		3
304 Forest Entomology		3
305 Advanced Entomology		5
306 Advanced Entomology	5	
307 Advanced Entomology		5
308 Beekeeping	1	
309 Beekeeping		1
310 Seminar	1	
311 Seminar		1
312 **Problems in Forest Entomology.** The study and application of methods of forest insect investigations. Each student will be assigned a practical problem in Forest Entomology to work out under direction.		
313. **Problems in Forest Entomology.** A continuation of No. 312.		

Including the courses in Agricultural Chemistry which are given by the unaffiliated Department of Chemistry, there are given by the departments of the School of Agriculture a total of 198 courses of instruction with a total of 527 semester credits. This is an increase during the biennium of 32.5 per cent in the number of courses of instruction offered, and of 39 per cent in the number of semester credits. It should also be noted that the Freshman class is so large that it is necessary for it to meet in three sections; indeed, for some of the courses even a fourth section has been found necessary, thus further materially increasing the instructional requirements.

Winter Short Courses.—No feature of the College work has developed more rapidly than have the Winter Short Courses. While the length of these courses has been reduced from six to four weeks, it has been found possible, by increasing the number of lectures given each day, and by making provision for greater specialization, to offer to the farmer or orchardist who is interested in some particular line of work, practically the same amount of instruction during the shorter course as was previously given in the longer. The exercises of Farmers' Week have also developed remarkably, not only in the number and variety of lectures given but also in popularity and influence, as is indicated by the unusual increase in attendance. The total Short Course attendance for the first year of this biennium (1911-12), is approximately two and three-fourths times that of the preceding year. In five years this attendance has increased from 56 to 1445.

Summer School Agriculture.—Courses in the following subjects were given during the six-weeks Summer School by the School of Agriculture:

Basic Agronomy.
Crop Production.
Stock Judging.
Live Stock Management.
Farm Dairying.
Plant Propagation.
Orchard and Garden Practice.
Floriculture.
Poultry Husbandry.
Elements of Agriculture.

(For details of registration see Report of the Director of the Summer School.)

Extension Work.—The various members of the Agricultural faculty have been called upon to conduct Demonstration Trains, Farmers' Institutes, and Itinerant Schools; to prepare exhibits and act as judges at various fairs; to deliver lectures upon all sorts of occasions; to prepare circulars; and conduct a heavy correspondence.

(For details of this work see Report of the Director of Extension Work.)

FACULTY

Numerical Strength.—The Agricultural faculty, exclusive of those who are engaged only in Experiment Station work, now consists of thirty persons. Most of these, however, are also in the employ of the Experiment Station and give to their experimental work much of their time and energy. Assuming that the time devoted to College and Station duties by each of these persons is in proportion to the relative amount of salary received respectively from College and Station funds, the actual teaching force of the entire Agricultural faculty is approximately equivalent to twenty-two full-time instructors.

Efficiency.—A complete change in the faculty, in the course of instruction, and in the quarters of the Department of Bacteriology has occurred during the biennium, and I am certain that with Professor Beckwith in charge, much more efficient work is being done than ever before

The Department of Horticulture, with the addition of Associate Professor Peck, now has, I believe, one of the strongest, best balanced faculties of horticulture to be found in any institution. This, with the facilities provided by the Horticultural building, and the fact that our field of work covers what is recognized as one of the most progressive horticultural sections of the country, enables the institution to offer undergraduate courses in Horticulture that I believe are not excelled, if indeed they are equalled, elsewhere. That this fact is being recognized beyond the borders of our state is shown by the large number of students who come from other states and from abroad to pursue these courses.

The addition of Dr. McCool and Mr. Braker to the Agronomy faculty, and the reorganization of the work of the Department which Professor Scudder has thereby been able to arrange, places the undergraduate instruction in Agronomy, likewise, upon a very satisfactory basis. This also is indicated by the rapidly increasing number of students who are majoring in Agronomy, and by the active demand for graduates.

In the other Departments no material changes have occurred in the personnel of the faculties. The various instructors are more experienced, however, are better acquainted with Oregon conditions, and as a rule are threby made more efficient. In fact, I feel that Oregon has reason to be enthusiastic over her Agricultural faculty. It is made up mostly of young men—earnest, enthusiastic, hard-working, efficient. All have the best available collegiate preparation for their respective positions, most have supplemented this by practical experience and are familiar with Oregon's needs, and nearly all are experienced teachers.

The chief factor which tends to decrease the instructional efficiency of the faculty is the fact that the amount of teaching, the demands for various forms of extension service, and the administrative work incident to the much larger number of students, all have increased more rapidly than has the instructional force. As a result, practically every instructor is attempting to carry more work than he can do in the most satisfactory manner.

A comparison statement of the student enrollment and the number of instructors, tabulated below, shows that in six years the number of Agricultural students has increased more than five fold; those in the Winter Short Course approximately twenty-five fold; while the faculty has been multiplied by only three and three-fourths.

Table Showing Increase in Number of Students and Faculty 1906-07 to 1912-13.

	06-07	07-08	08-09	09-10	10-11	11-12	12-13
Long Course	80	109	187	217	237	301	402 (Nov. 1)
Short Course	56	70	130	420	537	1445	......
Faculty	8	14	19	22	25	28	30

At many institutions fifteen hours of class room instruction per week is considered to be a full assignment for one instructor; at most of the larger institutions the average is even less. When one considers the unusually large amount of time that is required for preparation by an instructor in Agriculture, or in the Agricultural sciences, due to lack of suitable text-books and the consequent necessity of constantly revising lecture notes to keep pace with these rapidly advancing sciences, to the necessity of collecting and preparing material for laboratory exercises and demonstrations, assembling apparatus and machinery, etc., it is evident, I think, that the instructor in these subjects, if he is to do his most efficient work, should be assigned a lighter rather than a heavier class schedule. The table* which follows, however, indicating the actual amount of class room work that is being carried this year by each instructor, shows that the twenty-two full time instructors are each carrying an average of approxmiately 22 1-2 hours of class work per week. It should be noted also that this does not include the large amount of correspondence and other forms of extension work, instruction given in Summer School and Winter Short Courses, the preparation of reports, nor the rapidly increasing amount of administrative work, all of which should be credited to the above mentioned twenty-two instructors. On the basis of 15 hours per week per instructor thirty instead of twenty-two full-time instructors are needed to do the class work now required in the School of Agriculture.

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*Not published, but submitted with this report.

Students.—The present registration in the School of Agriculture is 402, distributed as follows:

First Year Secondary	36
Second Year Secondary	24
Freshmen, Degree Course	138
Sophomore, Degree Course	79
Junior, Degree Course	54
Senior, Degree Course	34
Graduate, Degree Course	13
Special, Degree Course	24
Total	402

Demand for Graduates.—Nothing better illustrates the recent development of faith in farming and interest in agricultural education than does a glance through the Directory of Alumni of this institution.

The economic conditions during the latter part of the last century were such as to offer but little encouragement to ambitious young men to follow farming as a profession, and there was practically no demand for agriculture experts. As a result, during that period comparatively few elected the course in agriculture.

During the past six years, however, one hundred six have graduated from these courses, thirty-two now expect to graduate with the class of 1913 and they are headed towards the farm. Of this one hundred six more than nine per cent. are engaged in some agricultural pursuit, as in shown by the following tabulation:

General Farming, including Stock Raising	36
Orchardists	29
Agricultural College and Experiment Station	22
Teachers of High School Agriculture	8
Seed Experts	2
Creamery Manager	1
Horticulturist for R. R. Company	1
Superintendent Silk Production (India)	1
Chemist	1
Merchant	1
Bridge Contractor	1
Musician	1
Graduate Student	1
Occupation unknown at present	1

It should also be noted that most of those who have chosen farming as a profession have deliberately done so because of a genuine interest in the farm and a firm faith in the opportunities it provides. The demand for such men to teach Agriculture in the high schools of this and other States, or to enter Agricultural college or experiment station work, has become so urgent that, personally, I have interviewed every member of the last three graduating classes in search of candidates for such positions with but scanty success notwithstanding the fact that the salaries offered have ranged from one thousand to twenty-five hundred dollars per year. The great difficulty now is not to induce Agricultural graduates to return to the farm but to get anywhere near enough of them to consider these other positions, which they alone can fill satisfactorily, and which must be supplied if the insistent demand of business, professional and farming interests for increased activity in Agricultural education, research and demonstration is to be met.

INCREASED FACILITIES

The following increased facilities for the School of Agriculture have been provided during the biennum:

Buildings.—Horticultural Building: The South, or Horticultural wing, of the Agricultural group is 72x130 feet and three stories high. In the basement are located laboratories for plant propagation, spraying, vegetable preparation, and fruit packing. The basement also contains the general storage rooms for the Department, and rooms which are especially adapted for the storage of fruits. The first floor contains the offices of the Division of Horticulture, the research laboratory, systematic promology laboratory, and three lecture rooms. The second floor contains the offices of the Department of Botany and Plant Pathology, three recitation rooms, and three student laboratories. The third floor contains the Horticultural museum and Horticultural herbarium, photograph room, large student lecture room, drafting rooms, lecture rooms, and office of the Landscape Gardening section. These rooms are all especially well lighted and contain every convenience for conducting the work with efficiency.

Greenhouses: A new range of greenhouses, modern in every respect, has recently been constructed, with a view to aiding the student in his studies in commercial greenhouse work. The range is made up of five even-span houses, three ninety feet long by twenty feet wide, and two thirty-three feet long by twenty feet wide, making the total area under glass 6,720 square feet. A modern hot-water heating aparatus has been installed, with pipes and valves so arranged that different temperatures can be maintained in every separate thirty feet of house in the three long houses. Each of the large houses has been divided into sections thirty feet long so that the entire space in each may be given up to a single crop. Of the two smaller houses, one is given up to research work and one to the propagation of plants in general. The central building is large and conveniently arranged for all work that is to be met with in greenhouse establishments. Such crops as carnations, chrysanthemums, violets, palms, ferns, general pot plants, and forced vegetables, like tomatoes, lettuce and cucumbers, are grown in these houses.

Dairy Building: About sixty feet to the north of the Agricultural Building is located the new Dairy Building. The general scheme of both outside and inside finish is similar to that of the Agricultural Building. The structure is 54x141 feet, three stories high. On the first floor are located the offices of the Dairy Department and commodious laboratories for butter making, cheese making, and market milk instruction, including a well equipped boiler and engine room, and student lockers. On the second floor are the testing laboratory, farm dairy and shop rooms. The third floor is temporarily occupied by the Department of Mathematics, with the exception of a general lecture room, extending across the south end of this floor, and having a seating capacity of two hundred.

Farm Mechanics Building: A new building has recently been completed for the Farm Mechanics work. It is an attractive, well lighted brick building, having a large operating floor, a class room, locker room, shop and tool room on the first floor. This operating room is of cement and is roomy enough for demonstration and for the operation of the heavier farm machines. Within this place is reserved space for the very heavy farm tractors. A gallery surrounds the operating floor and provides space for the lighter farm implements such as the tillage, haying, and harvesting machines.

The building is equipped with shafting, belting and power for the operating and testing of various machines. A large well is provided for making pump tests and a very large equipment of the most up-to-date farm machinery is loaned the institution by the leading implement dealers of the Northwest; so that the student has constantly before him, to work with and to study, the very best classes of farm machinery of all types.

Representative machines are found in the laboratory as follows: Plows, harrows, pulverizers, cultivators, plant setting machines, corn planters, potato planters, grain and grass seeders, mowers, rakes, binders, sprayers, manure spreaders, potato diggers, wagons, etc. Among the power machines are stationary gasoline engines, various types of pumps and pressure water systems, feed grinders, gasoline tractors, steam tractors, gang plows, and complete threshing machines. All of this expensive equipment is available to students in Farm Mechanics in both the regular and Short Course work.

The Stock Judging Pavilion: The facilities for work in Animal Husbandry at the College have been increased during the past year by the erection of a new Judging Pavilion. The pavilion provides very comfortable and commodious quarters for all of the live stock work. The main room is 40x90 feet, well lighted and provided with steam heat. A movable partition is provided whereby this large room may be divided into two smaller ones, each one large enough for all ordinary purposes. The live stock work in the past has been very much handicapped by crowded quarters without heat or good light, but these difficulties are now past and the Department is in a position to do much better work than before.

This building was unfortunately destroyed by fire on October 23 and the work of the Department of Animal Husbandry is for the present seriously hampered. Fortunately, however, the State Board is vested by law with authority to replace such losses and provision has already been made to replace this pavilion.

College Stock Farm.—For a number of years one of the most pressing needs of the Departments of Agronomy and Animal Husbandry was for more land. This need fortunately for the present has been supplied through the purchase of an excellent tract of land comprising one hundred fifteen acres at a cost of $22000.00. This farm is conveniently located and is exceptionally well suited for Agronomic or Animal Husbandry work. The soil is typical of the Willamette Valley, being a fertile gray clay loam. The land is gently rolling and with suitable buildings, drainage and fencing can be easily classed among the most attractive farms in Western Oregon.

Equipment.—Approximately $15302.72 has been expended for equipment for the various Departments as follows:

Agronomy	$1420.00
Agronomy College Farm	3000.00
Animal Husbandry	316.00
Dairy Husbandry	4000.00
Horticulture	1862.00

Poultry Husbandry	444.72
Bacteriology	2350.00
Botany and Plant Pathology	735.00
Zoology and Entomology	1175.00

PLANS AND REQUIREMENTS FOR 1913-14 TO 1914-15

No material changes in the instructional work of the School of Agriculture are contemplated other than such as are made necessary by the rapidly increasing number of students; and by the addition of a few new courses of instruction. Estimated upon the basis of increased registration during the past two years, the normal increase for the coming biennium will amount to approximately twenty-five per cent per annum. Provision must be made for this increase. Provision should also be made for the following additional courses of instruction:

(1) The class work in Animal Husbandry should be strengthened by the addition of two courses.
  (a) A two credit course in Live Stock Practice and
  (b) A three credit course in Advanced Stock Judging for Seniors.

(2) Much interest is now developing over the State in the question of Horticulture By-Products. The Horticultural Department reports that a heavy correspondence relating to this phase of Horticulture is being received, and that students are already beginning to ask for courses of instruction in it. Many industries succeed in proportion to the profits which may be realized from their respective by-products, and I feel that this institution could be of great service to the rapidly developing Horticultural interests of the State were we to make provision for research work and courses of instruction relative to the various Horticultural By-Products. The utilization of culls and other waste products will become more and more important with the development of the Horticultural industry.

(3) While it seems almost impossible to make room in our schedule for such a course, I believe that beginning with the school year 1914-15, all Agricultural students should take a course in Poultry Husbandry during either the Freshman or Sophomore year. The Department of Poultry Husbandry should also be enabled to offer the following courses for the benefit of students ma-

joring in that Department, and for such other students as may desire to elect them:

(a) Markets and Marketing.
(b) Feeds and Feeding.
(c) Poultry Hygiene, including Physiology, Anatomy and Diseases of Fowls.

(4) The economic work of the Department of Zoology will also be materially strengthened if provision be made for the following work:

(a) A course in the study of microscopic animals with reference to their economic importance, particular importance being given to their relation to the problem of "sour soils."
(b) Animal Parasites, a study of the animals that are parasitic on or in the bodies of man and the domestic animals.
(c) Extend the requirements in Zoology 101, 102 for Agricultural students from 3 to 5 and 3 to 4 credits respectively. This has already been approved by the faculty.
(d) Extend the opportunity for advanced work in the economic phases of Zoology.

Students, Estimated Enrollment.—Examination of the table on page 15 shows that each year for the past two years the number of Agricultural students has exceeded that of the preceding year by more than 25 per cent. Should this ratio of increase continue throughout the coming biennium the registration, exclusive of Short Course students, for 1913-14 will exceed 500, and for 1914-15, 625. The number of Short Course students can scarcely be predicted.

Faculty Requirements.—In estimating the instructional requirements for the next two years, two factors must be considered. First, that the present force is unable, even with the present undesirably heavy schedule to do the work now required without the aid of student assistants. Second, that in all probability the amount of class work will increase in approximately the same ratio as the attendance, even though no additional courses of instruction be given.

(a) Instructors: Bearing these facts in mind, I have carefully studied the various Department reports and see no escape from the conclusion that at least five more instructors on full time will be required at the beginning of the school year 1913-14, and possibly three more, for the year 1914-15. It is imperative that one instructor be added to the force of each of the following Departments: Agronomy, Dairy Husbandry, Bacteriology, Botany and Plant Pathology, and Zoology. One additional instructor will be required in the Department of Agronomy in 1914-15, and probably one each in the Departments of Animal Husbandry and Poultry Husbandry.

(b) Teaching Fellows: In addition to the above full time instructors there will also be required, as at present, several students or graduate assistants to aid in the larger laboratory classes. Student assistants are usually unsatisfactory, and I would therefore recommend that provision be made for a number of Teaching Fellows in the School of Agriculture. These Fellows should be graduates of this or other standard institutions and should be employed upon half-time, with the privilege of pursuing graduate work toward advanced degrees. The advantages of the Fellowship plan are threefold. First, properly trained assistants, especially interested in the subjects to be taught, could be secured. Second, the institution and the State while paying for but one-half of each Fellow's time would in reality secure the benefit of a much larger proportion of his services, as in most instances the subject for thesis investigations could be so selected as to strengthen the economic work of the respective departments. Third, each Department would have in training men for any instructorship which might be needed in the future.

If the above plan be approved, provision should be made for the following Teaching Fellowships:

Teaching Fellows in Botany	4
Teaching Fellows in Zoology	2
Teaching Fellow in Bacteriology	1
Teaching Fellows in Horticulture	2

If the Fellowship plan be not approved, much less efficient services can be had at a slightly less cost by employing the same number of student assistants.

The above estimate of eight additional instructors and nine Teaching Fellows is based upon the minimum requirements for conducting the courses which are already offered. It does not make provision for courses which might with advantage be given, nor does it provide for additional extension work for which other provision should be made by the Department of Extension Work.

(c) Salaries: The present salary requirement for instructional services of the thirty instructors and for clerical assistance amounts to $33,292.00 per annum.

The value of an Agricultural faculty to the State depends (1) upon its ability and training; (2) upon its experience, and knowledge of local conditions. The same is true of the individual instructor. Since the faculty as a whole, therefore, is each year becoming more valuable to the State by added experience, and since the salaries they now receive are on the average lower than those paid by similar institutions for similar work, it would seem that it is not only just but profitable to the State to provide for such salary increase for capable, efficient men as shall at least serve to retain them in the service of the State and the College. Just what this increase should be is, of course, problematical. Knowing as I do, however, the worth of these men, the disparity between the salary paid here and at other similar institutions, and the fact that several of our best men have already declined offers of higher salaries than they now receive, because of interest in their work here, I believe that provision for an average increase of 20 per cent in salaries for the coming biennium should be made. If this recommendation be approved and the increase be made at the rate of 10 per cent per annum, the total salary requiremnt for the biennium for the present force would be $76.904.52.

Five additional Instructors (biennial)	$10,800.00
Three additional Instructors 1914-15	3,500.00
Nine Teaching Fellows (at $500 per year)	9,000.00
Total	$100,204.52

Live Stock Needed.—The vast live stock interests of this State would certainly be justified in demanding that better provision be made for work in Animal Husbandry at this institution than now exists. Neither in live stock nor in other equipment are the facilities anywhere near adequate for satisfactory work. That students may have the opportunity of working with a reasonably large number of animals, facilities should be at once provided for handling cattle and sheep in car load lots. Purchases of car loads of suitable animals can then be made from time to time, used for class purposes and then sold. It is essential also that the College flocks and herds should be materially improved both in size and quality. Present conditions are unjust to the instructors, to the students, and to the live stock interests of the State.

Buildings.—The completion of the Agricultural Building, the Dairy Building, The Farm Mechanics Building and the Stock Judging Pavilion has provided adequate quarters for the work of most of the Departments—or they will be adequate when certain rooms in the Agricultural Building which are temporarily used for other work can be vacated.

The facilities for satisfactory work in Animal Husbandry and Poultry Husbandry are still entirely inadequate, as they are for certain special lines of work in some of the other Departments. Most of the buildings needed for this special work are small and inexpensive, still the total cost for all that are recommended in the various Departmental reports amounts approximately to $82.750. To this should be added $30,000 to $40,000 for a building with auditorium and several large lecture and demonstration rooms for Short Course work. The facilities for this work are already inadequate. When one considers the many needs of the College, one can scarcely expect that all these buildings can be erected during the coming biennium.

Animal Husbandry Buildings.—In addition to the need for live stock mentioned above, there is urgent need for at least two buildings, if anything like adequate provision is to be made for live stock work. 1st. A Stock Barn to cost approximately $10,000, should be provided to accommodate the stock at the Judging Pavilion. This is needed not only to accomodate animals that are brought from College flocks and herds for class purposes, but it is also essential for the proper accommodation of animals which are so kindly loaned to the College for instructional purposes by various breeders of the State. 2d. A Veterinary Building should be provided as soon as possible. Satisfactory work in this important subject cannot be given unless adequate provision be made for more clinics. This will require a suitable building with special equipment. This building should provide an anatomical and post-mortem laboratory where dissection and post-mortem work can be given; a clinical and operating animals that are brought from the College flocks and herds for class purposes, but it is also essential for the proper accommodation of animals which are so kindly loaned to the College for instructional purposes by various breeders of the State. 2d. A Veterinary Building should be provided as soon as possible. Satisfactory work in this important

subject cannot be given unless adequate provision be made for more clinics. This will require a suitable building with special equipment. This building should provide an anatomical and post mortem laboratory where dissection and post-mortem work can be given; a clinical and operating room where all classes of clinical and surgical work can be demonstrated; a pharmaceutical and physiological laboratory for the work in Materia Medica and physiology; stables for provision for the isolation of contagious cases; and suitable class rooms and offices. The character of the work precludes the use of other buildings for this work, thus making it necessary for the best interests of the work to provide such a building, for which not less than $15000 is required.

Poultry Building.—The Department of Poultry Husbandry is also seriously handicapped by entirely inadequate quarters. A special Poultry Building is greatly needed. The demand of students for special, efficient training in this branch of Agriculture is growing much faster than are our facilities. To quote from Professor Dryden's report:

"Whatever is done in the way of providing a poultry building ought to be done with an eye to the future. It would be a serious mistake to put several thousand dollars into a building now and in three to five years find that another would have to be built to furnish the necessary accommodations. In a few years, if not at present, we could fully utilize a building of the dimensions of the Dairy Building.

"If the building is placed in a suitable location, all poultry work could be carried on within its walls. There should be offices for Station work as well as for College instructors, an office for the Head of the Department, a general office for Station workers or clerks, offices adjoining class rooms for Assistant Professor and instructors, laboratories for student work for planning and constructing poultry houses and equipment, room for candling, grading and packing eggs, room for killing, dressing and packing fowls for market, room for operating incubators and hatching apparatus, a cooling room for dressed poultry, an egg storage room, a room for cold storage to investigate problems in cold storage of eggs and chickens, a laboratory for reasearch and instruction work in poultry diseases, a feed room for practice work in studying rations and mixing feeds, a drafting and photographic room for preparing plans of poultry houses and poultry appliances and for photographing fowls and preparing material for illustrating bulletins, etc; there should also be a study room or reading room with poultry magazines and reference books and bulletins. There should also be a sleeping room for the attendant of the College poultry.

"An entire floor of the building would be used exclusively for demonstration and exhibition purposes. We should give a special poultry course each year and this room should be fitted up for demonstrations for this work. Here should also be locatted permanent exhibits and demonstrative material for the benefit of visitors who come from a distance to get information. Many people visit us each year for this purpose, and if we had our demonstration room fitted up we could make it fully worth their while. During the past year we have had several thousand visitors at the plant, but as the plant we now have is an expermental one, it is not available for demonstration work. Hence I feel that we have not been able to give proper attention to visitors who come for a day to study special points. I believe this is very important work. While we meet a hundred students in the class room, we meet in this way a thousand farmers and practical poultry keepers who would make the best possible use of the information. Poultry Husbandry lends itself readily to demonstration work and we should make the most of it."

Agronomy Greenhouse.—"For the past three years the Department of Agronomy has been urging the necessity of greenhouse room for the laboratory work of Soil Fertility, Soil Physics, Cereal Crops, Agrostology, Crop Improvement, Crop Breeding, Irrigation Farming and Dry Farming. In all of these courses a certain amount of pot culture work is done. The new greenhouses constructed adjoining the Horticultural wing have been completely occupied by that Department, so that room for Agronomy work can not be secured there. In addition to this these greenhouses are so far distant from the Agronomy laboratories that they are not only inconvenient but in some of the work impossible to use. The laboratory work in Soil Fertility has been decreased fully 30 per cent in effectiveness because of lack of greenhouse room, and in the other courses named the average loss in ground covered in the laboratory would be 10 per cent., at least, owing to the lack of this greenhouse room. I urge most strongly that this room be supplied. It should be constructed at the rear of the Agronomy wing, adjoining the Soil laboratory and connected with the heating system of the Agronomy wing. This location would in no way hurt the appearance of the Agricultural Building group, but indeed would improve the rear view of the group. The location would be exceptionally convenient and effective for Agronomy laboratory work. The cost would be no more than if located elsewhere. The equipment for this greenhouse has been included under that heading. The estimated cost for a house of the necessary size is $1250.00."

Agronomy Seedhouse.—"The necessity for a seedhouse on the College farm has been noted for some time in the Experiment Station reports of the Agronomy Department. The present seed room in the barn was put in for temporary use as a seed room, eventually to be utilized for other purposes. This seed room is utterly inadequate, as can be seen by a walk through the barns at any time, the alley ways and ceiling beams of which are crowded with seed. Aside from the inconvenience, the loss of this seed is heavy since it is high priced stuff. This important product and part of farm work, can be taken care of in no other way but by the erection of a seed house. The plan is shown on page 44 of the Biennial Station Report for 1909-10. This plan shows one large room with concrete floor to be used as a threshing, cleaning, weighing and shipping room. In this room is located a motor-driven thresher, separator and fanning mill, together with scales. Surrounding this room are on one side large storage bins for market seed, on the other the bins for storage of seed to be used in Experiment Station planting while on the third side is a mouse-proof storage room for grain in the straw, forage samples, etc., to be preserved and used for exhibition and class room purposes; also a fumigation room in which seeds are tested for various diseases and insect pests; and finally, a mouse-proof room for the breeding seed, that is—for the breeding seed and the seed selection work. In the garret room of this building is provided the room for kiln and air drying corn seed. Very few institutions in the country are without such a seed-house. The need of it here is imperative The estimated cost is $1500."

Botanical and Horticultural Greenhouses.—Additional greenhouse space for the Departments of Botany and Horticulture is needed badly.

"The Department of Botany has an arrangement at the present time with the Horticultural Department whereby one-third of the Greenhouse extending West from the potting shed is used by the Botany Department for instructional needs. With the great increase in students which will come during the biennium ending July 1, 1915, this space will be inadequate.

"At least 30x20 feet would be needed for instructional purposes and the same amount for Station purposes during the coming biennium. This could be provided in two ways, either by the erection of an additional greenhouse to the present plant, especially designed for the work of the Department of Botany, or by the constructing of a conservatory to the East of the present range of houses, to be used for the ornamental plants and certain type plants for illustrative use in both Floriculture and Botany, in fact for all of the general collection of potted plants. This would relieve considerable space in the greenhouse, a portion of which could be turned over to the use of the Botanical Department. This conservatory should be as large as possible and should be so built as to accommodate large plants, such as palms, tree ferns, etc. Cost $5000 to $10000."

The Horticultural Department reports that the present house is not adapted to greenhouse conservatory work. "A building could be constructed so as to hold the material that is used in College decorations and all plants of economic importance used in the classes of Botany and Horticulture. Such a building should be made attractive and would be a most pleasing sight to the visitors. It would relieve the general congestion very much. The sections now used for that purpose could be used for research, experimental work, or instructional work."

Horticultural By-Products Building.—If the research and instructional work in Horticultural By-Products referred to above, is to be undertaken, a By-Products building of considerable size, but not necessarily expensive, would be required. Fifteen thousand dollars would probably suffice to provide both building and equipment. There is no doubt that the great value of research and instructional work in Horticultural By-Products to the fruit interests of the State would abundantly justify this expenditure.

Agricultural Auditorium Building.—At present there are not more than two lecture rooms in the institution that will seat comfortably above seventy-five persons, and not a single one that will seat more than two-hundred-fifty or three hundred. The Winter Short Course work is growing rapidly in popularity and in value to the State. Already "standing room" is at a premium in some of the classes and a large tent has been used to accommodate some of the work. Nowhere can all of the Agricultural students, either regular or Short Course, be assembled for important lectures or demonstrations, and no suitable rooms are available for the meeting of Agricultural societies or conventions. To meet this need, which is already pressing, for large lecture and demonstration rooms, an Agricultural Auditorium Building must be provided in the near future. A building suitable for this purpose would cost probably $30,000 to $40,000.

Estimates of Recommendations

In order to avoid duplication of data, the estimates of necessary expenses for the various departments of the School of Agriculture, together with the recommendations concerning them, are reserved for another section of this report; namely, Departmental Estimates of Requirements.

Respectfully submitted,

A. B. CORDLEY

Dean of the School of Agriculture.

REPORT OF THE DEAN OF THE SCHOOL OF DOMESTIC SCIENCE AND ART

To the President of the College:

Sir: I have the honor to submit to you the report of the School of Domestic Science and Art. With this report I am including certain recommendations in regard to further conduct of the **School of Domestic Science and Art** and a conservative estimate of the probable growth and needs of the school during the next biennial period.

Changes in Department.

During the fiscal year of 1911-12 there was no dean of the school Mrs. Brooks, head of the Department of Domestic Art, acted in the capacity of dean. She discharged the duties attached to the office with rare executive ability. The entire organization bears witness of her business-like and thorough administration. At the same time that she was carrying the responsibilities of dean, she was organizing her own department of Domestic Art in a manner which should meet the approval of all interested.

During the same school year the department of Domestic Science was under the control of Miss Milam who was assistant professor in Domestic Science. Under serious difficulties and extremely trying conditions, Miss Milam administered the work thoroughly, reorganizing many of the courses and strengthening the scientific quality of instruction in all lines of the work. The duties of dean and head of the department of Domestic Science I did not assume until July 1, 1912. Hence I have depended upon Miss

Milam and Mrs. Brooks for the statistics of the previous fiscal year.

Student Enrollment.

In the regular four year's course in Domestic Science and Art there were enrolled in 1911-12, 221 young women. There were in the secondary courses 36, besides 103 who carried the four weeks' Short Course and attended the Farmers' Week. In addition to this the night classes and Camp Cookery classes were well attended.

In the Department of Domestic Science there were at the beginning of the year 1911-12 two instructors on full time and one other instructor on half time. During the second half of the year the instructional corps was increased so that there were three women giving their entire time and two giving half of their time to the department. An additional helper was brought in for the Short Course.

At the present time there are 265 young women in the School of Domestic Science and Art. Of these 35 are in the secondary classes and the remaining 230 in the regular four year's course. The attendance indicates that the regular four year's course has increased 38 per cent. Ninety-two per cent of the young women entering this year come with an average of 39 college credits. This is extremely satisfactory as it indicates that we are receiving a more mature and thoroughly prepared class of students. We have reason to believe that these students are more apt to remain through the course and graduate.

The classes are all heavy and the indications are, at the time of the preparation of this report, that there will be large classes in the evening school and the Camp Cookery classes. A complete and attractive course has been arranged for the Farmers' Week and hearty co-operation is being made with the Extension Department for a successful rural conference Four courses of instruction will be offered in the Winter Short Course. In the Department of Domestic Art there are four instructors besides the head of the department. With the normal growth of these two departments the students enrolled in the four year course will reach 325 during the year of 1913-14, with an approximate number for the year of 1914-15 of 425.

One new laboratory was equipped and the general equipment was increased.

A bulletin on "Camp Cookery" was issued by Miss Milam and Miss Smith, but the supply is now exhausted.

Need of New Building.

The School of Domestic Science and Art is divided in portions of three buildings. The second floor of the Agronomy building consists of four Domestic Art laboratories, one Domestic Art lecture room and laboratory combined, a small office for the head of the department, and a rest room which is equipped for the care of temporary sickness of the young women. The Dean's office and class room are on the second floor of the Agricultural Building, while all food preparation is done in the basement of Waldo Hall. All these various rooms are greatly crowded and are occupied almost continuously from eight in the morning until six in the evening. The rooms in the basement of Waldo Hall are difficult to ventilate, ill-lighted and inconvenient, while the long standing upon the cement floors is detrimental to the health of both the teachers and students. As the number of students in these laboratories is greatly increased, the gas plant is so wholly inadequate that much of the time it is impossible to keep the full number of flames alight. The lack of a satisfactory gas supply greatly hinders in the food preparation classes.

The need of a building devoted entirely to the School of Domestic Science and Art is so apparent that there is no need of entering into a discussion. It is impossible to carry on effective work under these conditions which are menacing to the health of both student and teacher.

Additional space has been granted to the school of Domestic Science and Art this year. A large and well-lighted class room for Domestic Art has been arranged in the northeast corner of the second floor of the Agronomy Building. It is planned that the room will serve as a laboratory when not in use as a lecture room. The original Domestic Art class room has been converted into a rest room and a Home Nursing laboratory. It is supplied with emergency remedies and such other equipment as is necessary for the illustration of the lessons in Home Nursing.

The new offices assigned the Dean have been furnished with desks, chairs, etc. The room used as lecture room for the Domestic Science Department on the second floor of the Agricultural Building was already furnished when given to the department. Some much needed equipment has been purchased for the Domestic Science laboratories in the basement of Waldo Hall. A full time clerk has been employed by the dean and other officers of the school.

Change of Name of Department.

The increased attendance of students will greatly increase the number of additional instructors and new equipment needed for the departments of Domestic Science and Domestic Art. Because of the evident promises of rapid increase of students in the School of Domestic Science and

Art and because of the relation that is certain to develop between this school and women's work in general over the state of Oregon, and because of the connection that this school will inevitably have in development of the technical courses for girls in the schools of the state, the following general recommendation is made:

That the School of Domestic Science and Art receive the name of the School of Home Economics. This suggestion is made because similar departments in most of the Land Grant college have already received this name. At the last meeting of the Association of American Agricultural Colleges and Experiment Stations, in Columbus, Ohio, the Committee on Instruction in Agriculture made the following recommendation. "In this report (referring to the report made to the National Educational Association at San Francisco) was embodied the definition of 'Home Economics' by the committee and it was agreed that the term Home Economics be employed as a designation of the general subject in colleges, elementary and secondary schools. The committee believes that it would be a great advantage to have the term used in this way and earnestly recommends that the instructors in this association use this term to designate the department in which this subject is taught."

The committee on instruction of agriculture of which Dr. A. C. True was chairman reports the following at the meeting held in Washington, D. C., November 16, 1910. This meeting was the annual meeting of the convention of the Association of American Agricultural Colleges and Experiment Stations. "Home Economics is a distinctive subject of instruction including the economic, sanitary and aesthetic aspect of food, clothing and shelter as connected with the selection, preparation and use of the community in the home or by groups of people." It says further that "in all colleges and universities the work in Home Economics will naturally be pursued in three main divisions: interior instruction, research and exterior instruction or extension work. " The following suggestions are made with the above definitions in mind; First, as above stated, that the present School of Domestic Science and Art be renamed and be hereafter known as the School of Home Economics; that its organization should be broadened so as to include a department of Domestic Science, a department of Domestic Art, a department of Household Administration, a department of Extension, and a department of Research.

Reorganization.

The department of Domestic Science would include all phases of food purchasing, food preparation and service. The Domestic Art department would include, as now, all phases of the study of fabrics and the manufacture of clothing and of textile industries. The department of Household Administration would include house construction, house furnishing, household management, hygiene and home nursing. The department of Extension would include, as defined in the last report of the American Agricultural Colleges and Experiment Stations, "all extra-mural teaching and demonstration, and, for the present at least, the supervision on behalf of the college of secondary Home Economics training in the public schools." In the original the word Agricultural was used where Home Economics is now inserted. Work of this type has been done in the past and is being done at the present, but some special provision should be made financially for its maintenance and a sufficient number of instructors in the School of Domestic Science and Art should be supplied, so that the work may be carried on effectively without detriment to the regular instructional duties.

It is not here suggested that there be professorships created in all of these various departments but growth to that condition should be anticipated. A portion of any extension fund granted should be allotted to extension in Home Economics but it would be in all ways desirable that hearty co-operation exist between the Department of Extension and the School of Home Economics and with that of Extension in agricultural education.

The Domestic Science Department will need two new laboratories equipped for the opening of the fall semester of 1913-14. Two additional instructors will be required and even then the number of hours will be heavy, since the administrative work will take up an increasing amount of time which will naturally lesson the amount of attention that can be paid to the detailed work of Domestic Science in the School of Domestic Science and Arts.

Domestic Art Department.

I take occasion to embody here parts of the report of Mrs. Brooks, head of the department of Domestic Art.

"In reorganizing the work this year the Domestic Art work has been put in the Freshman year, the Domestic Science in the Sophomore, while the students elect their major work in Domestic Science or Domestic Art in their

Junior year. Electives are offered in the Senior year so that it is possible to equip a student for teaching either Domestic Science or Domestic Art, or both.

"The work in the Domestic Art Department has been systematized and graduated. The band sewing and garment making in Freshman year, the dressmaking in the Junior, and tailoring and advanced dressmaking in the Senior. Since the students have been allowed to elect their major work in Domestic Science or Domestic Art in their Junior year, there is no Domestic Art in the Sophomore year.

"At the beginning of the year of 1911, the faculty in Domestic Art consisted of the head of the department, an instructor, and a second instructor on half time. At the close of the year, there were the head of the department, one full time instructor, one two-thirds time instructor, and two half time instructors. In addition a full time instructor was employed for the Short Course. At present, the faculty consists of the head of the department and four full time instructors.

"In 1911 two sewing laboratories were equipped for twenty students each, one basketry room for twenty students. During 1911-12 an additional sewing laboratory was equipped and a textile room opened. Additional equipment for the laboratory was also secured to the amount of slightly over $1000.00.

Extension Work.

A very vigorous line of work in Extension has been maintained by the various members of the School of Domestic Science and Art. This has been in co-operation with the college Extension Department and has proved satisfactory. It has somewhat affected the general instructional work since one member of the Domestic Science faculty has been away much of the time. A week's exhibit of Domestic Science and Art was given at the State Fair which necessitated the attendance of five members of the instructional corps of the school.

It is the plan of the members of the school heartily to co-operate with all work for the improvement of rural welfare. We are ready to attend meetings of woman's clubs, congress of mothers, parent-teachers associations, farmers' institutes, teachers' institutes and in any way assist those desiring information along the lines maintained in the school. It seems desirable to organize and maintain short courses in various parts of the state for the instruction of women who are unable to go to college. It is also the plan to present a number of correspondence courses and to offer to women's clubs study outlines that will be of help to those desiring knowledge in home making lines.

In addition to the courses heretofore given we should like to offer a six months' housekeeper's course open only to women twenty or more years of age, and having no other entrance requirement than a completion of the eighth grade work in the common schools. Such courses as this one mentioned are given in many institutions similar to this and are found to meet the need of a great many women to whom a full college course is an impossibility and who are too old to care to take up that which is now classed as our secondary work. This course could well consist of food preparation two hours a day, two hours of domestic art, lecture on hygiene and sanitation one hour, and two hours each day to some agricultural study as poultry husbandry, horticulture, or floriculture. It is also desirable that in connection with the summer school one or more lines especially adapted to those who are already teaching Domestic Science and Art be offered. If all of these plans are carried out it will necessitate the increased instructional corps before recommended.

Again considering the need of a new and thoroughly modern building, equipped in all ways equal to the best in the country, let it be remembered that if such a building be not supplied, then other institutions will quickly outstrip the Oregon Agricultural College and we shall lose the high rank which we now maintain. All progress along the lines of women's education tend toward this vocational training and a great and compelling interest is being taken in the subject of Home Economics.

This college must be ready to meet this need in such a manner that it may supply the demands put upon it by the citizens ot Oregon and attract the attention and approval of the citizens of other states.

Respectfully submitted,
HENRIETTA W. CALVIN,
Dean of the School of Domestic Science and Art.

REPORT OF THE DEAN OF THE SCHOOL OF ENGINEERING AND MECHANIC ARTS

To the President of the College:

Sir: I have the honor to submit the following report of the work and requirements of the School of Engineering and Mechanic Arts.

When the last report was made two years ago we had recently increased the entrance requirements by about one year of the high school work, and as a result were laboring under many disadvantages, one of which was a transitional course to articulate the old courses of study with the new. With graduation of the class last June, this handicap disappeared leaving our engineering courses on a much better basis.

I am pleased to report that the four departments constituting the School of Engineering are better organized and are doing a better grade of work than ever before.

This result has been brought about by two principal causes; First, a better classification and assignment of work among the instructors, giving to each the line of work he is most interested in, and holding him responsible for results.

Second, better preparation on the part of the entering students. In short, the work of the school has been intensified in character and broadened in scope during the past two years.

In Civil Engineering and Mining Engineering, new groups of work have been arranged so that students in these two engineering courses may major in one of the optional groups during the junior and senior years. This is more satisfactory to the students, and is carried out with little addition to the teaching force.

Faculty.

The heads of the departments, and in fact all of the teaching staff of the school, are working in perfect harmony for the uplift and advancement of the college. Never has the spirit of cooperation and helpfulness been more in evidence than at the present time. The results are clearly shown in the close attention of students to their work and the comparatively few failures or changes of courses of study.

The work assigned to instructors is fully set forth in the department reports and need not be repeated here.

Students.

All heads of departments report a marked improvement in the preparation of the entering class. This is no doubt due to the present rapid development of the high schools of the state, and to the fact that students are learning to appreciate the advantage of a thorough preparation before entering upon their college work.

This view is further substantiated by the notable decrease in the number of secondary students who apply for admission. When we note that 112 new high schools were organized last year in the state, we can understand the reason for these changed conditions.

The following statistics, compiled from the records of the registrar's office, furnish some interesting information on the subject of our entrance requirements.

Number of Freshmen in Engineering	112	
Number who were here last year as secondary or freshmen students	24	
Students entering the college this year for the first time	88	
		Per cent.
Having 2-year high shool preparation	24	27.3
Having 2½-year high school preparation	6	6.8
Having 3 year high school preparation	11	12.5
Having 4-year high school preparation	47	53.4
Number entering conditioned in preparatory mathematics	31	35.2
Number entering conditioned in preparatory English	3	3.4
Given credits for one year college English	49	55.6
Given credit for two years of college English	27	37.
Given full credit in Trigonometry	15	17.

No account is here taken of college credits allowed in the sciences or language other than English. The credentials on file in the Registrar's office show a large number of such credits.

These figures indicate that we are now receiving more than one half of our freshmen students from four-year high school courses. They further indicate that these students bring a large number of credits with them over and above the number required for entrance. These credits may be offered as the equivalent of some of the college work required in the course, but a large part of them do not apply to the college course and hence might as well have been offered as entrance subjects.

The registration of such students is a difficult matter because their work is so irregular. I believe that we should take cognizance of these facts and increase our entrance requirements to conform to this new condition.

No more credits for entrance should be required in mathematics than at present, but additions might be made to English, and an optional group including chemistry, physics, modern languages, manual training and other subjects, which would place our entrance requirements on the basis of a four-year high school preparation, and enable students with that preparation to receive credit for their work as entrance requirements, and register in the freshmen class where most of them do at present.

Enrollment.

The total enrollment of courses is as follows:

Civil Engineering	61
Electrical Engineering	85
Mechanical Engineering	78
Mining Engineering	18
Mechanic Arts (secondary)	36
Total	278

The most notable feature of the present enrollment is the increase in the number of freshmen, which amounts to 37.7 per cent. over last year, and the decrease in the number of secondary students which amounts to 35.7 per cent. as compared with last year's class. This latter result indicates that the secondary course in Mechanic Arts will soon be eliminated by lack of students.

Equipment.

The records of the business office show that the following amounts were expended for equipment during the present biennium:

Civil Engineering	$ 494.84
Electrical Engineering	1607.46
Mechanical Engineering	12175.84
Mining Engineering	913.00
	$15191.14

The item of $12175.84 charged to the mechanical engineering includes the complete equipment for the foundry, equipment for a manufacturing wood work shop, and for a plumbing and steam fitting shop.

New Buildings.

The completion of the new Mines Building in time for the opening of college work this year marks a distinct step in advance for the department of mining engineering.

This building is 87½ feet by 62 feet, and has three full stories and a basement. It was erected at a cost of $31,846 and in construction is one of the most modern and complete buildings on the campus. When fully equipped this building will provide room for distinct lines of work relating to mining engineering as follows:

Basement Floor

Large laboratory for work in ceramics; crushing and grinding room; storage room for rock and mineral samples; locker room.

First Floor

Assaying laboratory; ore testing laboratory for determining the milling qualities of ores; offices.

Second Floor

Large room for the State Bureau of Mines laboratory; lecture room fitted with lantern; two large and one small recitation rooms.

Third Floor

Mineralogical laboratory; petrological laboratory; geological museum; drafting room for the department.

At the present time the ceramics laboratory and the ore testing laboratories are entirely without equipment. Forming as they do, a very close connection with the mining and clay isdustries of the state, it is hoped that this equipment may be added the coming year.

Owing to the great pressure for room in other departments of the college, a number of rooms in the mining building are temporarily assigned to other work. For example the classes in architectural drawing occupy the geological museum; one room is devoted to rectitation work in woodworking; classes in English and modern language also use some of the recitation rooms. When the department is fully equipped and present plans carried to maturity all of the room in this building will be required for the work of the mining department and the Bureau of Mines.

One of the most notable improvements in the shops during the biennium was the construction of a new shop building 35 by 120 ft. This building contains the foundry, which has been fully equipped with cupola, brass furnace, coke ovens, moulding tools, and a pipe-fitting and plumbing shop, principally for use of the college in making repairs and improvements. A woodworking shop equipped with machinery for manufacturing equipment for the college, is also located in this building.

The foundry has accomplished all that was expected of it. It makes the shop work instruction in the engineering departments complete. In conjunction with the woodshop and machine shop, it greatly facilitates the construction of apparatus and equipment for the mechanical and other departments of the college.

A report from Mr. Riderour shows that 16,350 pounds of sound castings were produced last year. The actual loss in melting was 3 per cent., and the melting ratio was 5.3 pounds of iron to one pound of coke. This is regarded as a very satisfactory result from the small plant operated by students.

DEPARTMENTS

Civil Engineering.

Prof. Skelton says in his report that "The course in Civil Engineering offered by this institution has been materially broadened in its scope and strengthened in its quality in the past two years. We are now providing four optional groups in the senior year leading to specialization in Hydraulic Engineering, Highway Engineering, Structural Engineering, and City and Railroad Engineering."

This arrangement offers sufficient elasticity to the engineering work so that students may choose their special line of effort in the senior year, without burdening themselves with extra work.

If the results of the group system are as satisfactory as we expect them to be, it is our intention to extend the plan still further in the enigneering work of the various departments of the School of Engineering.

One subject or branch of the work in Civil Engineering failed to attract the interest we had predicted for it. I refer to the road work under Prof. Ayers. This work was carried on for more than a year and yet there are no tangible results. About the only teaching done was the direction of two students in advanced road work for nearly one year. The remainder came under the head of extension work and is outside the province of this report. It seems that no great interest has been aroused in this direction, although a manuscript was prepared in Highway Improvement which has been published by the college as a bulletin, and a number of lectures given in different parts of the state.

I still believe that this road work should be one of the strong features of the School of Engineering, and sincerely hope that we may take it up again in the near future.

Electrical Engineering.

The work done in this department is very thorough an systematic and affords splendid training for a young man preparing to enter the field of engineering.

Prof. Hillebrand in his report says: "The situation with regard to Electrical Engineering Education on the Pacific Coast is believed to be unique. From San Diego to Puget Sound and as far east as Idaho the light, power, telephone, and railroad business is in the hands of less than thirty corporations which constitute the possible employers of our graduates who wish to remain on the Pacific Slope."

"Many of the above mentioned corporations are financed by eastern capital with eastern affiliations, and draw yearly some of their recruits from that section. The coast also attracts technical men, and officials of a single corporation have reported as many as one application a week from graduates of eastern colleges and universities."

"The report of the Carnegie Foundation and members of the profession universally testify to overproduction, which means that if the Oregon Agricultural College is properly to serve the people of the state in this department, it must strive for quality and output through rigorous standards and strongly discourage those who are not evidently fitted for the work."

In discussing the work further, it appears that there is a field of employment for our graduates in connection with the sale and installation of electrical fixtures and in illuminating engineering. I believe this side of the electrical work should be developed and encouraged by providing an optional group of electrical credits in the senior year of that course.

Mining Engineering.

It is hoped that the department of Mining Engineering with its new building and improved equipment will show greater progress during the next biennium. This department has labored under great disadvantages in the past on account of lack of accommodations and equipment.

Much has been done during the past two years through the State Bureau of Mines in collecting and publishing information concerning the mineral resources of the state.

Prof. Parks says in his report:

"Owing to the fact that Oregon's mineral and geological resources are very largely undeveloped, I am convinced that the most important work which the Mining Department of the Oregon Agricultural College should do in the next few years is in the field of investigational work."

The state law creating the Bureau of Mines makes the head of Department of Mining Engineering in the college also the Director of the Bureau of Mines, hence the work is brought into very close relation with the work of the college.

It is the purpose and duty of the college to assist in every way possible in the development of the resources of the state, hence this arrangement should redound to the credit of both the Bureau of Mines and the college.

In the purely educational work, the department has recently taken a step in advance and now offers segregation of work beyond the sophomore year into four groups, giving oportunity for students to major in mining, geology, ceramics, or industrial chemistry.

The Ceramics group is of special importance in assisting to develop the clay industries of the state. The laboratory equipment for this branch of the work should be secured and installed at an early date.

Mechanical Engineering.

The work done in the Department of Mechanical Engineering has shared in the general improvement already noted in other departments.

The total enrollment of students has increased from 45 in 1910 to 76 at the present time, showing a total increase of 69 per cent. A comparison of the freshman classes alone shows a gain of 215 per cent in the two years. This is sufficient to indicate a healthy growth in the future. The present senior class is the first to complete the course since entrance requirements were raised four years ago. This class will complete six term credits in mechanical engineering which were not given in the old course. In addition to these subjects, the present course provides for two years of modern language or its elective equivalent in English and political science, as well as six credits of public speaking which were not given in the old course. It is readily seen from the above statement that we are giving a much more comprehensive course in mechanical engineering than formerly.

In accordance with the plan adopted in other engineering departments it may be desirable to offer optional groups in the near future. One suggestion is a course in gas-engine and automobile work which could be provided for in this manner.

Experimental Engineering.

While the work in experimental engineering is carried on under the direction of the Mechanical Engineering department rather than under a separate department head, it is closely allied to all of the engineering departments. Instead of duplicating the work as is done in many institutions, we have pursued the more economical policy of equipping our laboratory and having all the work done there. I might add that great progress has been made by Prof. Graf in developing this work.

The value of the equipment is now about $10,000. It is composed mostly of high grade standard apparatus purchased from the manufacturers, but many small items have been constructed by Prof. Graf and his assistant. While the equipment appears large when its value is summarized as a single item, it is really quite small for the purpose. There is scarcely any equipment for the division of hydraulics, or power measurements; indeed, it is impossible to equip and build up an engineering laboratory which would fully meet the needs of the college until more room can be secured. In any case, such a laboratory must be the result of a steady growth, aided by judicious care and tireless energy on the part of those directly in charge of the work. I think we should have $5000 per annum for a period of five years, to spend for equipment in order to place this laboratory on a good working basis.

The demand for commercial testing and outside work is steadily increasing and will soon reach a point where special provision will have to be made for taking care of it.

A considerable quantity of data and valuable information has already been accumulated, some of which should be published in the form of bulletins.

The publication of bulletins on subjects of engineering relating to the characteristic industries of the state, is a matter to which a number of the land-grant colleges are now turning their attention. In my opinion we should enter the field as soon as conditions will justify our doing so, without hampering, in any way, the regular college work.

OTHER COURSES

Architecture.

There seems to be an increasing demand for instruction in architectural drawing and kindred subjects. This demand has been met in a rather unsatisfactory way by allowing students to register in the course in Mechanical Engineering, omitting General Chemistry, Mechanical Drawing, and certain of the shop courses, and taking in lieu of this work Architectural Drawing, and other subjects relating to Architecture.

This plan can hardly be satisfactory to the department of Arts and Architecture, nor to the department of Mechanical Engineering. It assumes to teach students the basic principles of Architecture and building construction and at the same time leaves out both chemistry and physics upon which an elementary knowledge of the materials of construction is primarily based. By leaving out these subjects, a student cannot complete the course and graduate in Mechanical Engineering, nor is any provision yet made for him to graduate in Architecture.

The fact that seven members of the freshman class have registered for Architectural work under these unfavorable conditions indicates that there is a real demand for a course in Architecture. I hope that such a course may be established next year, either in the School of Engineering or as a separate department, where this work can be properly classified, and placed on the same basis as the other courses.

Industrial Arts.

The rapid development of the high school system of the state and the introduction of agriculture, domestic art, and manual training as required subjects in these schools, has created a strong demand for teachers who are qualified to take charge of this work.

It is very doubtful if the graduates of our regular courses of study are prepared to take up the teaching of these industrial subjects in a professional way. A graduate of an engineering course would surely lack the special training in pedagogical subjects to make him a successful organizer, or a teacher of manual training work to the immature pupils of the grades and high schools. It seems to me that we have a legitimate field here which requires our close attention. On the whole, the equipment required for the mechanical side of this work is extensive and costly. But we already have most of it in use by our regular engineering students for an entirely different purpose. As shown in the departmental report, Prof. Jackson estimates that $800.00 spent for additional equipment would put us on a good working basis for undertaking this work. And for the next two years very little, if any, additional teaching force would be required. It might be desirable to employ a man to do extension work in this particular field; to attend institutes and school meetings; to visit schools where the work was being organized and give advice and assistance to those in charge. I believe the college would by so doing establish a close relation with high schools which would be of mutual advantage to the people of the state, the schools, and the College.

I am making the suggestion with full knowledge that a large part of the work would necessarily fall outside of the School of Engineering, and wish to say to those interested that we are ready to cooperate with them in promoting and developing this work.

Extension Work.

There seems to be no great demand for extension work in the School of Engineering, except in the mining department under the direction of the Bureau of Mines, already mentioned. The latter is fully discussed in Prof. Parks' report and need not be continued here.

The demand for extension work in Highway Engineering will have to be created by first proving to the people of the state that we can be of real assistance to them not only in solving the problem of good roads but also in modifying the condition of existing bad roads. In order to make headway in this work, it will be necessary to secure the services of a man of rare tact and good judgment, as well as technical ability to carry on the work according to the best known methods.

I presume the subject of correspondence instruction may properly be mentioned under this heading.

It has never occurred to me that we should offer correspondence courses in Engineering. This work would be far too comprehensive for our teaching equipment and would entail great initial expense in preparation. The field, moreover, is already covered by at least two large schools with national reputations. It does appear feasible, however, to offer some correspondence instruction in such subjects as mechanical and architectural drawing, and certain elementary principles of engineering applied to rural life, provided the college should take up the subject of correspondence instruction as a matter of college policy.

Library

It is gratifying to note that the engineering library has been greatly improved during the past biennium. The transactions of the leading engineering societies have been added, the list of periodicals extended, and a considerable number of new technical books placed on the shelves.

Better results may be obtained by increasing the list of technical papers and periodicals, and adding the bound volumes of the proceedings of leading societies, than by investing largely in books. Many of the latter are soon out of date and useless, some are obsolete almost before they leave the press of the publisher.

Small appropriations, like that of the last biennium, continued from year to year, should build up a valuable working library.

Repairs and Improvements.

Some repairs and improvements about the buildings are now badly needed.

The old concrete steps at the Monroe street entrance of the shop building are in a condition that makes them dangerous to those who use the entrance. They should be replaced by new steps of suitable design to conform to the improvements that have been made on this street.

The area way between the shop buildings should be hard surfaced with concrete, or at least reduced to grade, drained and gravelled.

The old wooden platform and steps at the rear entrance of Mechanical Hall should be replaced by a more substantial structure.

Storage room for shop supplies, such as coke, scrap iron, and flasks for the foundry, and storage room for lumber for the woodworking shop is an urgent need.

The former could easily be obtained by extending the foundry building about 20 feet toward the east.

The storage for lumber, paints, oils, benzine, and other inflammable materials could be provided for by a cheap structure of corrugated iron placed near the shop building. While such a building would not be attractive in appearance, it would satisfy an urgent need, and after all would not be more unsightly than the present arrangement, whereby much of this material is piled out of doors or stored in hallways and class-rooms.

It is understood that estimates of the cost of these improvements and repairs are furnished in other reports, that feature is not discussed here.

Additional Room.

The problem of room in which to carry on the work of civil and mechanical engineering is becoming difficult to handle.

The situation is described in my report of May 18, 1912 as follows:

"The most urgent need that the School of Engineering has to face at the present time is the need of more room. The department of Civil Engineering needs another recitation room and a larger instrument room. The department of Mechanical Engineering needs more shop room, and additional recitation rooms. The engineering laboratory has grown rapidly and has utilized all of the room available until it now seems necessary to call a halt because no more room can be had. The department of physics occupies quarters in Mechanical Hall which are entirely inadequate to its needs, and has no immediate prospect of relief, although nearly all the students in the college who are taking degree courses are required to take physics."

"The shops, which four years ago were thought to be ample for years to come, are already congested in the wood working department so that the efficiency of the work is threatened."

"The only conclusion which seems reasonable to one in touch with the situation is that a new engineering building should be provided during the next few years, probably on the site of the old heating plant, or near there. This building might be planned so that a wing or portion of it could be constructed at an early date, to relieve the urgent needs, and the main part added several years afterwards. This when completed should be the main engineering building and should be of 'Class A' construction. It should be carefully planned with reference to present needs and future requirements."

"While the construction of such a building for engineering may at this time appear visionary and impractical, yet I believe that it is none too early to decide upon some definite plan for taking care of the engineering work, and having decided, work with that end in view."

"I present the matter to you at this time for consideration, well knowing that there are other needs to be taken care of first, other buildings to be constructed first; and that new demands are arising on every hand. However, if we are to take and maintain a position among the efficient schools of engineering, we must build up our work to the highest efficiency; we must plan carefully and well, and it is with this in view that the matter is presented at a time which, in other respects, might seem inopportune."

Respectfully submitted,
G. A. COVELL,
Dean of the School of Engineering and Mechanic Arts.

REPORT OF THE DEAN OF THE SCHOOL OF COMMERCE

To the President of the College:

Sir:—It is gratifying to report the same general progress and growth in the School of Commerce as has characterized the whole institution since my last biennial report. This growth is evidenced, not only by the increased enrollment, but by the expansion of courses, and by the character of the students' work. Below you will find a synopsis of the work of the last biennium and recommendations for the next.

I. ON THE LAST BIENNIUM

Condition of the Department.

The most notable growth has been in the demand for commercial courses from other departments, particularly for economics and political science. The organization of a department of political economy under Doctor Macpherson is a step in the right direction, and has greatly improved the work throughout the school. Both the character and the extent of the work of the School of Commerce is now recognized outside of the state as approaching the work of leading institutions in the East. In a recent report of the Educational Committee of the American Association of Public Accountants, on one hundred of the leading universities in the United States, we are ranked with ten schools giving complete courses in Commerce, as follows:

1. Columbia University.
2. New York University.
3. Northwestern University.
4. Oregon Agricultural College.
5. St. Louis University.
6. University of California.
7. University of Denver.
8. University of Illinois.
9. University of Pennsylvania.
10. University of Pittsburgh.

The character of the students' work has improved partly because of the advanced standard, partly because of the increased facilities in the instructional force, but mainly because of the better preparation and greater maturity of the freshmen.

Faculty

The faculty of the School of Commerce consists of the following members:

J. A. BEXELL, Dean of the School and Professor of Business Administration.

J. B. HORNER, Professor of History and Instructor in Penmanship.

R. D. HETZEL, Professor of Political Science.

HECTOR MACPHERSON, Assistant Professor of Political Economy.

E. B. MOORE, Instructor in Stenography, Business English and Business Arithmetic.

E. B. LEMON, Instructor in Accounting and Commercial Law and Assistant Statistician.

MRS. E. B. MOORE, Assistant in Typewriting.

Enrollment.

A. Registration by Classes.

Year	Total	Sen	Jun	Soph	Fresh	1st 2d	2d 2d	Grad	Spec	Short C.
1908 1909	143	19	16	29	30	35	3		10	1
1909 1910	154	12	25	25	21	31	29	4	7	
1910 1911	135	21	10	24	26	16	17	1	9	11
1911 1912	169	8	23	23	52	20	22	2	5	14
1912 1913	132	12	14	25	44	14	12		11	

Table B Shows the enrollment by localities. From this you will note a steady decline from Corvallis, due, doubtless, to the growth of the local high school.

B. Enrollment by Localities.

Year	Total Reg.	Corvallis	Portland	Eastern Oregon	Others of Ore.	Other States	Foreign
1908 1909	143	31	8	21	67	16	
1909 1910	154	55	14	19	57	9	
1910 1911	135	39	10	19	57	10	
1911 1912	169	40	10	17	80	20	2
1912 1913	132	27	14	13	62	11	5

The following table shows the demands that are made upon the Commercial Department for special courses. According to the Registrar's report, the School of Commerce ranks third in point of number of students enrolled in the various classes.

C. Enrollment by Courses.

Last school year there were enrolled in the various classes 159 regular students, while 539 received instruction in special courses required by other departments, as follows:

Industrial Accounting, four courses	142
Pharmacy Accounting	15
Rural Law, two courses	57
Winter Courses	55
Rural Economics	60

Correspondence Courses	45
Political Science, four courses	95
Typewriting	45
Penmanship	25
Regular Enrollment	159
Total	698

I quote from the several heads of departments:

Dr. Macpherson: "During the college year 1911-12 there were 214 regular students enrolled in this department. In the report issued towards the end of the year I estimated a probable increase for 1912-13 of fifty per cent. The report sent in October 5th for this semester shows an attendance of 315, or about 100 more students enrolled for the first semester than for the entire previous year. The enrollment for next semester will be much smaller, but will certainly bring the total up to more than double what it was last year."

Professor Hetzel:—"The department has grown both in work and in enrollment of students during the past biennium and is at present in a satisfactory condition with the exception that the work is not organized under one departmental head. At the present time the instruction is offered by Professor Hetzell, Professor Horner, and Mr. Lemon. This work should be centered in one department which should make it its major interest."

Mr. Moore:—"Our regular course in stenography covers a period of two school years. The students in all courses in stenography meet five time regularly each week in both shorthand and typewriting. Owing to the length of the time devoted to the work, and to the maturity of the average student of the department, I believe our work would be considered of a very high quality, in fact, much this character. When a student finishes the prescribed phy. The aim of the department is not to rush the student through his work, but to give him a very thorough training in all the fundamentals that belong to a course of this character. When a student finishing the prescribed course, he is competent to take up the regular duties ot fhe higher grade of commercial office work, secretarial work, or to enter the teaching profession in our commercial high schools. The work of the department, however, could be materially strengthened by the addition of needed equipment."

Professor Horner:—"At the present time there are 70 students taking penmanship, about 65 of these being in the Department of Commerce. It has been arranged for these students to take one lesson each week, inasmuch as they receive only one credit for the work. You have a splendid class of students in the Department of Commerce and it is a great pleasure to teach them. In fact, they are so anxious to improve themselves in the subject that it is a restful inspiration to spend an hour with them once a week."

Equipment.

It is very gratifying to report that the quality of our equipment is scarcely equalled by any commercial school in the West. Last year we purchased eighteen new typewriters and stands for about $1,000.00. A new Burrough's Adding Machine was also added at a cost of $270.00. There has been very little general equipment added except a set of office fixtures and a typewriter for the statistical bureau at a cost of about $150.00.

Improvement and Repairs

There have been no improvements in our quarters during the biennium beyond the addition of room 302, formerly occupied by Prof. Horner, and there have been no repairs worth mentioning.

Present Condition

On the whole the School of Commerce is in a very satisfactory condition and with a fair allowance for growth and development we look forward to a prosperous future. There is every indication of an increased demand for commercial work, as shown by Table C.

Bureau of Statistics

The last legislature appropriated $5,000.00 for statistical research to be carried on in connection with the publicity work of the State Immigration Commission. This appropriation, however, was subject to the release of the Governor, and it was not until March 28, 1912 that we were notified of the release of the appropriation. After organizing the Bureau of Statistics, it was found that there were two distinct lines of investigation which required immediate attention, if we wished to avail ourselves of the appropriation. First, the compilation of statistical data for a publication to be known as the Oregon Almanac to be published in a very large edition by the Immigration Commission; and, second a preliminary agricultural survey of the agricultural opportunities of the state. The work of the department was so arranged that Mr. E. B. Lemon could devote the greater part of his time to Statistics during the remainder of the school year, his entire time during the summer, and nearly all of his time during the present semester. Mr. N. B. Baldwin was employed as stenographer and office assistant. It was also necessary to press into service every department of the School of Agriculture, and to devote to the work a large share of my own time.

The work for the Oregon Almanac was completed about June 15th and the survey was begun June 17th. The plans had been perfected by an Advisory Committee at a meeting held May 18th, at which State Immigration Agent, C. C. Chapman, was also present. The committee, appointed by yourself, was as follows: Dean J. A. Bexell, Dr. James Withycombe, Dean A. B. Cordley, Prof. C. I. Lewis, Prof. H. D. Scudder, Prof. F. L. Kent, Prof. E. L. Potter, Prof. James Dryden, Dr Hector Macpherson, Dean G. A. Covell, Prof. H. M. Parks, Prof. G. W. Peavy.

The details and progress of this work are found in a report by Assistant Statistician, Lemon, attached hereto. At a meeting of the Advisory Committee held at the College October 25th, it was decided to co-operate with the Immigration Commission and State Immigration Agent, C. C. Chapman, in publishing a digest of the survey in an edition of 50,000 copies. It is expected that this will be ready for publication some time during the second semester of this school year. Owing to the impracticability of securing a trained statistician for only six months, and the condition of the appropriation, I was forced to participate in the statistical work far more than the teaching force of the department justifies. Should the appropriation continue and should it be desired to have the work permanently connected with the School of Commerce, it will be necessary to secure a trained statistician to take charge of this work. And this would also necessitate a continued appropriation in order to be able to carry on investigations requiring more than two years to complete them. Mr. Lemon deserves special recognition for his untiring devotion to the statistical work.

Commercial Museum

As shown in Dr. Macpherson's report, one of the most immediate needs of the School is a working museum and economic laboratory. This will receive special attention during the next biennium and will acquire a larger appropriation than any other phase of our work. It is of extraordinary importance, since fully two hundred students from

Agriculture and Domestic Science are taking work requiring illustrative material.

Doctor Macpherson says:—"As to our equipment, we now have a room for our museum. It is at present almost entirely occupied with the work of the Statistical Bureau. To make the museum representative of the work of the College, it will be necessary to secure the co-operation of all other departments. The engineering departments, forestry, the different agricultural departments, and domestic science, should each be represented by exhibits typifying the work of the department and the place of the department in the economy of the state.

The museum is intended for constant use in connection with the courses in Commercial Geography. These courses deal with the forces and materials which determine the commerce of the state, the nation, and the world. It is the aim of the department to make this a fundamental course, and the great unifying course for the college. This can only be done by the aid of all other departments."

Field Work.

Our statistical work has brought us in contact with a large number of the most progressive farmers in the state, and we have found that there is a demand for field work in farm accounting and statistics. If the statistical work is to continue and become more reliable from year to year, the financial reports must be based on uniform records. It is my opinion that a very important work could be done if the Extension Division could offer personal assistance in the business side of farming. With sufficient assistance, I should be able personally to give some attention to the work. The commercial faculty are frequently called upon for lectures and addresses. To meet this demand it is necessary to provide additional assistance.

The Commercial Club

The Commercial Club has done very effective work in promoting the interests of the School. A quarterly journal is being published jointly by the Commercial and Pharmacy Clubs, and a lecture course is being maintained in which prominent men from different parts of the state are asked to participate. More assistance could be had if a small appropriation were available for traveling expenses. I recommend that $100.00 for the next two years be appropriated for this purpose.

Correspondence Work

Upward of seventy-five students have been enrolled in correspondence courses. The School is now offering three correspondence courses known collectively as the Farmers' Business Course. This embraces (1) Farm Accounting and Business Methods, (2) Rural Law, (3) Rural Economics. The work has been highly satisfactory and I believe that much can be accomplished by this plan of instruction. However, little is being done in this work at present since there are no correspondence courses offered in other departments. I renew the recommendations I have made in several previous reports that the correspondence work be pushed as rapidly as circumstances will permit.

II. ON THE NEXT BIENNIUM

Change in Courses.

There were a number of changes in the courses during the last two years. Several new courses were added in political economy. Penmanship is still regarded as one of the essentials in the course, but no separate credit is given for it toward graduation. The same is true of typewriting.

Faculty

In order to do the work satisfactorily next year the faculty should be strengthened by at least three more members, namely: An instructor in Political Economy; a head of the Department of Political Science to relieve Prof. Hetzel, whose time is wholly occupied with extension work; and a head of the Statistical Bureau. It will also be necessary to provide a regular stenographer. Should it be necessary to relieve Prof. Horner of his work in penmanship, it will also require an adjustment so as to take care of his work. I should regret such a change, because excellent work has been done. especially during the last year in this important subject.

Regarding the future of penmanship, Professor Horner says: "I want to thank you personally for the support you have given in this department, I wish to submit to you the fact that I am trying to build up the Department of History in which I must have sufficient time to do outside reading and make preparation commensurate with the growing condition of the institution. Therefore, when upon conference with President Kerr you can relieve me of this Department, I shall feel as if I can devote more time to my department."

Doctor Macpherson says:—"If our program is carried out, it will occupy the time of two men to an extent not required by any other institution I know of which offers work in Social Science of college grade.

"I will never again undertake as much work as I am trying to do this year. For the past four years, I have been giving all my spare time to the theory and practical details of the work of rural economic organization. I hope to demonstrate within the next year that the state can afford to let me give more of my time to practical extension work along the lines in which I am specializing.

"I recommend that we get a thoroughly trained man, offering not less than $1200.00 a year for the next biennium. We cannot afford to put a man of high school teacher grade at teaching economics. By getting into the field early next spring, we should be able to secure a thoroughly equipped young man who would settle down and grow up with the work."

Professor Hetzel says:—"We need a professor of political science who would act as heal of the department at a salary of $1,800.00 for the first year and $2,000.00 the second year. An assistant who would devote a third of his time to instruction in the elementary courses—$400.00 per year.

"The head of the department should handle eighteen to twenty hours of instructional work. This will make it possible for him to care for most of the work of college grade. The elementary work and the balance of the college work could be carried by an instructor who gives part of his time to another department."

Additional Courses.

In order to give the graduates in commerce an opportunity to concentrate on a definite specialty and also for the purpose of facilitating enrollment, I recommend that The Junior and Senior courses be classified under four different heads, viz: Business, Administration, Political Economy, Political Science and Stenography. This will require practically no change in the present courses except in prescribing certain electives with each major the same as the plan in the agricultural courses. With an enlarged instructional force it will be possible to introduce several new electives and also materially to strengthen the required work.

Professor Hetzel says:—"I respectfully recommend that with the addition of the courses stated above, students be permitted to major in political science. This recommendation is made as the result of the large number of requests which have come to the department for special work in political sciencee and because of the importance of having the College take a leading part in the development of the government of the state which it serves. Government is now recognized as dealing intimately with the great economic problems as well as the social and political."

Estimated Enrollment

For several years the enrollment in the School of Commerce has fluctuated around 10 per cent of the yearly enrollment of the College. Estimating the total enrollment at an average of eighteen hundred students the enrollment in the School of Commerce should not fall far short of 180. This semester we are instructing 876 students and on this basis the total number receiving instruction in Commerce will not fall short of 1000 per semester next year.

Instructors' Assignment of Work.

The same general assignment of work will be followed as was reported March 30 last. It is impossible to state the minor changes in subjects until a head of the department of Political Science and an instructor in Economics have been selected. As stated by Prof. Hetzel the most serious defect in the department of Political Science is that it is at present without a responsible head. I most urgently recommend that a first-class man be selected before the beginning of next school year.

Below is a summary of the work done this year by the various instructors:

	Credits	Students
J. A Bexell	20	181
H. Macpherson	23	315
R. D. Hetzel	9	75
E. B. Moore	21	126
Mrs. E. B. Moore	4	78
E. B. Lemon	9	54
J. B. Horner	2	38
Total		867

In addition to this number Prof. Horner teaches one laboratory period of penmanship per week to all students taking Commerce 100, 101, at present 35 students.

Room.

Our present quarters, consisting of the entire third floor of the Agronomy building, are adequate for present instructional purposes. It will be necessary, however, to provide a separate room for the Bureau of Statistics if it is decided to continue its connection with the School. At present Room 304 is occupied jointly by the Commercial Museum and the Statistical Bureau, to the serious inconvenience of both. It would be preferable if Political Science could have quarters on the third floor. At present, Prof. Hetzel's office is on the first and his class-room on the second floor. If the demands on the School from other departments continue to grow, it will not be long before greatly enlarged quarters will be needed.

Improvements for Next Biennium

To avoid duplication of data, all recommendations for repairs and improvements of a specific nature are reserved for that portion of this volume entitled Departmental Estimates of Requirements.

Respectfully submitted,
J. A. BEXELL,
Dean of the School of Commerce.

REPORT OF THE DEPARTMENT OF FORESTRY

To the President of the College:

Sir: I have the honor to transmit herewith a report covering the work by the Department of Forestry for the biennium, July 1, 1911 to June 30, 1913, with the estimates of the need of the department for the biennium, July 1, 1911 to June 30, 1915.

Growth and Present Condition.

(a) During the past biennium the course of study for the Department has been completely revised, the purpose being to adjust the course to meet, as far as practicable, the requirements of professional instruction in forestry, at the same time fully considering the peculiar needs of the State. In its work the department aims to accomplish two distinct things:

First, to fit men for technical forestry work with the Federal Government, the State, or with private owners.

Second, to train men to be of use in actual logging and milling operations.

In all the instructional work the purpose is to couple the actual operation with its description. While the department is woefully deficient in equipment of all kinds, yet much has been accomplished by taking the men to the woods and mills for study and observation.

(b) No increase in numbers has been made in the instructional force during the past biennium.

(c) To show the consistent growth of the department the following enrollment figures are submitted:

1909-10	22
1910-11	31
1911-12	38
1912-13 (to date)	45

For the current year the students are enrolled as follows:

Special	1
Secondary	9
Freshman	18
Sophomore	8
Junior	7
Senior	2
Total	45

(d) The department occupies four rooms on the third floor of Science Hall. This space is poorly arranged and entirely inadequate to meet the needs of the work. The equipment provided for the department since the beginning of the biennium cost $201.79. It is absolutely inadequate to supply the needs of the department.

(e) No repairs or improvements have been made.

(f) Judged by the spirit shown by the students and the work done by them, as well as by the consistent increase in numbers, the department is in excellent condition. When one considers the magnitude of the lumber business, the number of men employed in it, and the field there is for the college to render effective service to the industry, the department is miserably equipped to do effective work.

Co-operative Work.

At a meeting of an association of the loggers of the Pacific Northwest, held at Tacoma during July of the current year, a committee, consisting of J. S. O'Gorman, of the Winconsin Logging and Timber Co., Chairman, and J. D. Young, of the Inman-Poulsen Logging Co., H. C. Claire, of the Clarke County Timber Co., and Geo. M. Cornwall, Editor of "The Timberman", was appointed to investigate the matter of arranging for instruction in "Logging Engineering" at the College. At the request of the chairman of this committee, Mr. O'Gorman, a tentative course of study covering that subject, was prepared by the head of the Forestry Department and submitted to the committee. At the invitation of the head of the department, the entire committee visited the College and inspected all departments of work thoroughly. As a result of this visit, the committee decided to enter upon an active campaign for the purpose of inducing the State Legislature to approriate sufficient funds to establish a school of forestry at the College provided with buildings and equipment, commensurate with the magnitude of the lumber industry, so that men may be properly trained to render efficient service along lines peculiar to that industry.

Peculiar interest lies in the fact that these men represent the lumber business of the State. Since they have shown the most cordial sympathy and interest in the work of the department and are determined to see to it that a way is provided for putting it on a proper footing, it appears that the very desirable condition of having a working agreement between a college department and the interest it was created to serve, is to be brought about. From the view point of the head of the department, the success of forestry work at the college is assured.

State Forest.

For some time the State Board of Forestry has been negotiating with the Federal Forest Service for the exchange of the scattered tracts of school land for a compact body of timber land located near the college. At the date of submitting this report arrangements for the transfer are practically completed. A tentative collection of about 46,000 acres of timbered land, lying just above Detroit, in the Santiam National Forest, has been made. This tract is directly accessible from the College. It is proposed to place this tract of land under the control of the Department of Forestry as far as the scientific management of it is concerned.

This area will be of great value to the department as a demonstration forest, a tract upon which practical forestry work may be done by students of the College, serving as a field laboratory for the application of principles and methods learned in the class room. By scientific management such a tract of forest land may be made a source of revenue to the State for all time to come. Suitable camp buildings and equipment should be provided for the use of instructors and students while engaged in field work.

Publications.

In addition to numerous educational articles contributed to the press of the State, the department, in co-operation with the State Board of Forestry, published a 24 page bulletin, entitled, "The Forests of Oregon". Through the State Forester's office, 50,000 copies of the bulletin were distributed throughout the State.

Work of the Department.

In co-operation with a committee representing the logging interests of the State, a tentative course in Logging Engineering has been prepared. The first two years of this course deal with the fundamental studies which are regarded as necessary foundation work for the technical branches of Logging Engineering, for example, English, Mathematics, Chemistry, Physics, Plane and Topographic surveying, and railroad surveying. Preparation for all-round citizenship is provided for throughout the four year course in such subjects as English, Principles of Economics, Labor problems, Public speaking, Constitutional Law, and State Government.

The technical courses proposed cover such subjects as logging railroads, forest surveying, timber cruising, mapping, bridge construction, steam machinery, general study of lumbering, logging devices and equipment, camp sanitation, explosives, and electrical machines.

By an arrangement with the committee representing the logging interests of the State, the men registered in the course in Logging Engineering will be given work in logging camps during the summer. This plan will provide for combining practical work with the theoretical work of the college. At the same time the men will be earning regular wages, thus being enabled to provide for a good part of their college expenses for the ensuing year.

Students.

Judging from the steady growth of the department and from the impetus which should come from the backing of the timber men of the State the average enrollment for the coming biennium should be as follows:

Secondary	20
Freshman	45
Sophomore	35
Junior (General Forestry)	10
Senior (General Forestry)	10
Junior (Logging Engineering)	15
Senior (Logging Engineering)	10
Total	150

Instructors.

Taking for granted the establishment of a course in

Logging Engineering, the following will show the estimated distribution of the work among three instructors:

	1st Semester			2nd Semester		
	Rec.	Lab.	Total	Rec	Lab.	Total
Peavy	8	6	14	11	8	19
Newins	8	14	22	11	17	28
(Log. Eng.)	8	14	22	10	17	27

REQUIREMENTS

Faculty.

With the addition of the course in Logging Engineering, at least one new instructor will be needed. Reference to the table above under "Instructors" will show that even this addition to the faculty will load the men with more work than they should be required to carry.

The instructor in Logging Engineering must be a man with college training and with experience in practical logging operations. Such a man will not be easy to find and when found cannot be employed at any moderate salary for the reason that the type of man needed is also needed by the logging operators themselves.

The needs of the department are such that a stenographer on half time should be employed. It is poor economy to require a man whose time is worth a dollar per hour to the institution to do work at a typewriter, which a stenographer, at 25 cents per hour, can do four times as fast.

Equipment.

The following is a conservative estimate of the equipment needed for an efficient conduct of the work of the department:

4	Light Mountain Transits	$720.00
1	Engineer's level	110.00
5	Tripods	60.00
2	Leveling Rods	40.00
10	Range poles	30.00
5	U. S. G. S. Plane Tables	150.00
4	Army sketching cases	104.00
4	Abney hand levels	54.00
3	100 foot rust proof tapes	39.75
4	Sets Surveyors' pins	8.00
1	Set Steel tape mending kit	6.00
1	Set drawing instruments	23.00
2	Protractors	15.00
6	Drawing tables (shop)	48.00
2	Adjustable curves	6.50
1	Aneroid Barometer	50.00

6 Cruisers Compasses (Forest Service Pattern)	30.00
2 Angle Mirrors	10.00
6 Cruisers tally registers	15.00
1 Barograph	45.00
5 Pocket lenses	25.00
6 Timberman Scale rules	9.00
6 Forest Service Calipers	18.00
A working collection of the commercial woods of the U. S.	450.00
A working collection of commercial tree seeds	125.00
1 Stereopticon	50.00
100 Lantern Slides	50.00
1 revolving duplicator mimeograph	25.00
Building and equipment for permanent field camp in State Forest	600.00
4 Compound microscopes	216.00
6 Stand microscopes	39.00
Total	3244.25

Importance of the Lumber Industry.

The forests of the state of Oregon constitute the commonwealth's second greatest resource. The lumber manufactured in the State annually is valued at approximately $30,000,000. Within a few years this vast sum will be greatly increased, since the supply of timber in the other forest regions of the United Stated is being rapidly exhausted. The opening of the Panama Canal will also give a tremendous impetus to the lumber industry by making possible the cheap transportation of this bulky commodity to the industrial centers of the East. Locally, the demand for manfactured timber will be stimulated by the period of great industrial activity upon which the State is now entering.

For the purpose of comparing the value of timber manfactured each year with that of the more important farm products of the state, the following figures, based on recent estimates, are of interest:

Wheat	15,231,000
Barley 2,317,000	~~23,140,000~~
Hay	10,129,000
Wool	2,242,000
Dairy Products	20,000,000
Fruit	6,662,000

Oregon has an estimated stumpage of about 545,000,000,000 feet B. M., about one-fifth of all the standing timber in the United States and an amount greater than that of any other state in the Union. Its manufactured value is estimated to be nearly $7,300,000. There are over 16,000,000 acres of forest land under the control of the Federal Forest Service. This land by Federal law is dedicated to the production of timber for all time. At least 5,000,000 acres of land in private ownership is suited to no other purpose than the production of timber, and will ultimately be devoted to that use.

At present there are approximately 700 logging camps in Oregon and the lumber business employs about 20,000 men. The timber industry contributes to the wealth and prosperity of the whole state. It has been estimated that 80 per cent of the total sum represented by the price of the manufactured timber product is expended for labor and supplies during the various stages of transferring the timber from the stump to the consumer. Thus it appears that $24,000,000 out of the $30,000,000 which the lumber industry contributes to the State annually, is expended for labor and in the purchase of supplies, permeating all the arteries of trade in the commonwealth.

Not only is Oregon now the most important timber State in the Union, but, under proper scientific management, this preeminence can be maintained; for nowhere else are natural conditions as favorable to timber growth as in western Oregon and Washington.

As has been indicated above, the income from the forests will be greatly increased by the industrial development of the State. Since the whole State is the beneficiary on account of the lumber industry, it would appear that the people as a whole have the same interest in protecting the forests, in properly utilizing the timber, and in providing for a future supply as they have in protecting the orchards of the State in order to insure the benefit of a future fruit supply, in studying soils and grains to increase the cereal yield, or in studying livestock in order to increase and perpetuate the meat and milk supply.

The State has been liberal in providing buildings and equipment for the study of problems relating to mining, dairying, animal husbandry, agronomy and horticulture, and for preparing young men to deal with these great industries; yet the forests, contributing more to the wealth of the State every year than any one of them, have thus far been practically neglected. This is neither to the credit of the State as a whole, vitally interested as it is in the lumber business, nor the College whose policy is to serve all the interests of the State to the fullest possible degree.

Orboretum.

The College should provide space for an orboretum of commercial trees of the United States. Such an orboretum is essential to the study of the silvical characteristics of the trees under our conditions here, and it would be of great value in rendering students familiar with the commercially valuable tree species. At the same time, experiments should be carried on with exotics in order to determine their adaptation to conditions in our State. Trees should be planted in blocks of at least one acre each to approximate forest conditions. To begin the work, a tract of forty acres, located within a mile of the College, should be provided.

Land suited to this purpose should be had at a price not to exceed $75.00 per acre.

Room.

In order that the great lumber industry of the State may receive the assistance from the College which is its due, a properly arranged and adequately equipped building is indispensable. Considering the future needs of the forestry work at the College, the following will indicate the room required for its proper handling. The figures given are close approximations of the desired floor space.

Laboratory of logging equipment	50′ x 100′
Laboratory of commercial woods	30′ x 40′
Working collection of manufactured wood products	50′ x 75′
Laboratory for forest pathology	30′ x 30′
Laboratory for forest entomology	30′ x 30′
Wood distillation laboratory	40′ x 50′
Wood preservation laboratory	40′ x 50′
Drafting room	40′ x 60′
Reading room	25′ x 35′
4 Recitation rooms	30′ x 40′
4 Offices	15′ x 20′

It is now the purpose of the timbermen of the State to ask the legislature for an appropriation of $50,000, to be used in constructing, at the College, a suitable building for various forestry purposes. Forestry schools in Idaho and Washington have been adequately provided for. If Oregon, having more timber than either of them, does not provide means for training men to deal scientifically with the various forestry problems, she will fall hopelessly behind her neighbors, who have been more progressive with respect to forestry education.

Recapitulation of Estimates.

Salaries (2 years)	$11,800.00
Equipment	3,244.25
Building	50,000.00
Land for Orboretum	3,000.00
Traveling Expenses	250.00
Office supplies	150.00
Total	$68,444.25

It is estimated that the requirements for Student supplies will be met by student fees, which are estimated at $220.00.

Respectfully submitted,

GEO. W. PEAVY,

Professor of Forestry.

REPORT OF THE DEPARTMENT OF PHARMACY

To the President of the College:

Sir: In compliance with your request I am pleased to place before you a report upon conditions as they have existed within this department for the past two years. Included also is an estimate of requirements for the biennial period beginning July 1, 1913, together with recommendations concerning matters of policy in conducting the affairs of the department.

You are aware, in some measure, of the series of unexpected occurrences which have interrupted and hampered the work of the department during the biennium, especially during the first semester of last year. At that time, the resignation, just before the opening of College, of Assistant E. C. Callaway, left the department short of instructors at a critical time; the abandonment by the department, of Alpha Hall, and the delay in finding other quarters, in Science Hall, still further impeded the progress of the work; while our inability to secure prompt possession of certain rooms assigned to our use, made it impossible to begin all of the work on time and was the means of interfering, to some extent, with the prosecution of the work throughout the year. For the current year, save for the fact that expansion in the chemistry department has been instrumental in depriving us of a portion of our laboratory space, conditions are much improved over those of last year. We were again delayed, indeed, by incompleted carpenter work in one of the laboratories, in beginning some of the instructional exercises; but we expect to complete all work by the end of the year.

It speaks well for the type of men women comprising the student body of the department to state that, instead of complaints at the hardships and annoyances encountered in carrying on the work, cheerfulness and good spirit prevailed.

Student Enrollment.

With respect to the attendance of the department, it is gratifying to note that the number is steadily increasing. The registration for the first semester of this year comes within four of being equal to the total number registered for both semesters of last year. Not only is the attendance increasing, but it is an encouraging fact that the students who come to us are older and have more and better preliminary training than has been evident before. Of the total number registered in the department, more than half are in the degree, or four year course, the remainder being in the short, or two year course. This would seem to indicate, contrary to the generally expressed opinion at the time of its inauguration, that the effect of offering such a course has not been to reduce the number taking degree work. It not infrequently happens that a student will enter the short course, and before completing it, will become so interested in the work that he asks to be allowed to transfer his registration into the degree course.

Changes in Credits.

At the beginning of this year there went into effect certain changes in the credit values of several pharmaceutical subjects. In each instance the work was amplified and the credits increased correspondingly. Nomenclature was increased from one credit for one semester to three credits for two semesters, this radical increase being rendered necessary because of the fact that the subject of Latin was coincidently dropped from the college curriculum. Pharmacognosy was increased a total of three credits, therapeutics one credit, general pharmacy three credits and pharmaceutical chemistry two credits.

The plan under consideration at the time these changes were decided upon, contemplated the addition of a first class experienced instructor to the pharmaceutical teaching staff.

As matters fell out, however, and no doubt for some good and sufficient reason, no such instructor has been added. Attempt is being made properly to care for the work with such instructional force as is available.

Permanent Location.

As has been stated, the department is now in the second year of its tenancy of Science Hall, and from experience encountered during this period, it is apparent that extensive changes will have to be made in the internal arrangement of the building, if proper consideration is to be given to operating facilities of the departments located within it.

In attempting to formulate a plan upon which to remodel the building and to reapportion departmental quarters therein, careful consideration has been given to the present needs and to the future possibilities of all concerned.

As you are doubtless already aware, the building was originally designed for purposes different from those which have of late been assigned to it. Therefore, in carrying into effect the proposed plan for modernizing the building, the operation will, as stated, involve extensive internal reconstruction work. These alterations once made, however, will result in a permanently usable building, adapted to the uses assigned it, and one which will justify the expense of the necessary changes.

To such an extent as the proposed changes will affect this department it may be briefly stated that the plan contemplates acquiring possession of rooms 304, 306, 307 and 311, on the third floor, and of all the space of the fourth floor for use as pharmacy quarters. This change implies the relinquishment of all rooms in other portions of the building now occupied by the department. The expense involved by the move itself need be only nominal, since in its brief occupancy of the present quarters the department has made no permanent attachments whatsoever.

The adoption of this proposed plan of relocation in the building would insure the maintenance of the close integral relationship between the several divisions of departmental work, much to be desired. Close association of lecture room, laboratories, office and store room are provided for, in anticipation of a general facilitation of departmental work The location would insure a minimum degree of interruption from outside sources, itself an item worthy of consideration. The possibilities for lighting and ventilation leave nothing to be desired along those lines.

Plans and detailed explanation of the proposed general alterations will be submitted to you by the department having charge of this type of college work.

Recommendations.

In looking forward to the probable needs of the department for the approaching biennium, attempt has been made to anticipate and to provide for all essentials of the work, and at the same time to keep within the conservative bounds respecting expenditures.

Instructors.

The services of a competent pharmaceutical chemist are needed. An arrangement probably could be effected whereby he could devote some two thirds of his time to duties within the department of chemistry, and the remainder to work in this department. A first class experienced man ought to be secured for not to exceed $2500 per annum. Of this amount $1000 could be charged to the payroll of the pharmacy department.

Office Supplies.

For this item it is estimated that a very nominal figure will suffice. Furniture, not to exceed $60; stationery, stamps and incidentals,$50, making a total of $110 for this biennium.

Equipment.

The department has been peculiarly unfortunate as regards the frequency of removals it has been obliged to make. Pilgrimage from building to building is a process very destructive to apparatus, through both breakage and loss, the latest experience in this line being especially severe. For the approaching biennium there will be needed a total of $2,240.

Laboratory Supplies.

An unusual drain upon the reserve supplies of the department has reduced the quantity of these commodities to a point where it is deemed advisable to recommend a material replenishment. The amount expended for this purpose would eventually be replaced by funds received as student fees. For this use $200 is asked.

Books and Periodicals.

It is estimated that $300 will cover the needs in this particular, for the biennium.

Botanic Garden.

A botanic garden in which growing plants could be studied, as under field conditions, has long been a desideratum. A plea is herewith registered for the establishment of such. Since a garden of this nature would be a feature of interest to several of the departments of the institution at large, the expense of founding and maintaining it should be pooled. The department of Botany, in apportioning the expense attached to this project, assigns to this department the sum of $250 per annum, hence the amount of $500 will be need biennially.

Gas Plant.

In the interest of economy it would seem advisable to establish a single gas plant of sufficient capacity for furnishing all laboratories of the college with an adequate supply of fuel gas.

This department has been wholly without a supply of gas during the entire time of the current biennium. Two machines supply gas to the laboratories in Science Hall, but inasmuch as the volume furnished was not sufficient for the needs of those already using it, pharmacy, upon its advent into the building, was denied permission to use it. Obviously,, the lack of gas has hampered our laboratory operations, and it is a condition which must be remedied soon if we are to expect from our students a degree of technical attainment beyond that of mediocrity.

If it becomes necessary to add a third machine to the two now in action, a sum of $750 will be needed to meet the expense.

Departmental Plumbing.

It is estimated that the sum of $390 will be required for necessary plumbing, during the biennium.

Removal Expenses.

Should the plan for moving the department to the upper floors of the building be carried out, the expenses attached to transferring the effects of the department and rehabilitating the laboratory furniture would amount to perhaps $100.

A recapitulation list of recommendations, upon separate sheet, accompanies.

Respectfully submitted,

C. M. McKELLIPS.

Professor of Pharmacy.

REPORT OF THE DEPARTMENT OF INDUSTRIAL PEDAGOGY

To the President of the College:

Sir: The work of this department is two-fold, (1) Administrative and (2) Instructional. Under the former may be listed: (a) Conference and cooperation with the heads of departments in which the technical instruction in the several industrial branches is given; this includes the preparation of courses for the elementary and high schools as well as the college courses of the students in the department. (b) Frequent interviews with students who are to teach the following year. (c) Collection and classification of government, institutional, educational association and other reports for use in department. (d) Correspondence with educators, school officials and others in Oregon and other states in regard to work of department. (e) Instruction in Oregon state, county and local teachers' institutes and educational meetings. (f) Visitation of elementary and secondary schools of the state in the interest of the department and College, and to keep in touch with the actual teaching in the class room. (g) Addresses at high school commencements and other public occasions. (h) Other field work in connection with farmers' institutes, commercial organizations and the like, as related to the advancement of industrial education. (i) Organization and direction of the the annual Summer session of six weeks. This work extends practically throughout the entire school year involving consultation with the members of the faculty in the selection of courses; securing additional instructors and lecturers from the state at large and from other states; correspondence with school officers in reference to the appointment of teachers. This duty is shared with the deans and professors in the several schools where the students have received their technical training. Twenty-five members of the 1912 class are now teaching in the elementary and secondary schools of this and other states and about thirty others from the classes of 1910 and 1911 have received similar appointments.

(2) Under Instructional, the following classifications may be made: (a) Of the seventeen courses offered, six are being given by the head of the department this semester, and four or five will probably be given the second semester. The 16 periods per week, required to give this instruction to 88 students enrolled, demand too great a proportion of the time available, which must be used at the expense of other and equally important duties. (b) In addition to class room teaching, directions must be given for the observation of the actual instruction of pupils in the public schools, not only in the industrial branches but in other school subjects as well, in order that the students may have some understanding of the relation of their special subject to the general work of the school. (c) In co-operation with other departments, courses of study are made in the different divisions of the industrial branches by the students in their courses in special methods. These courses are planned to meet the varying needs of the pupils in the elementary and secondary schools and with sufficient flexibility to fit the industrial conditions in the various sections of the state. The problem of correlation with the other subjects in the course of study is also studied and the student prepared as far as possible to understand the spirit and function of the public schools in order that he may be able to construct and adapt the course in his special subject to harmonize in every respect with the local requirements. (d) The instruction in the special method of teaching the several industrial branches should be given by instructors in the respective college departments under the general direction and supervision of the head of the department of Industrial Pedagogy.

In addition to the departmental duties, council committee assignment on Credientials, Substitutions, and Optional students calls for a good deal of time in reports and student interviews; 12 to 15 office hours per week are scheduled, largely devoted to this work.

Courses in Industrial Pedagogy.

The courses are elective to students in the Junior and Senior years with the exception of two, School Management and History of Education, which are open to Sophomores; and Psychology, which is required in the Senior year of the course in Domestic Science and Art. The schools of Agriculture, Commerce, and Domestic Science and Art announce that courses in Industrial Pedagogy may be included among the minor electives. These courses, in the opinion of the department, should be offered as majors. The only reference to Manual Training is in the detailed description of certain of the secondary courses in Woodwork in the Mechanic Arts course. The experience of the department is that by this plan insufficient notice is given both the students in college and those planning preparation for industrial teaching. The opportunities offered are not sufficiently prominent to attract the attention of either class.

Since the industrial subjects are just being introduced into the public schools of Oregon, a much larger supply of trained teachers will be required from year to year and the demand will steadily increase for a number of years. Some of these will be recruited from the student body each year from students who have not finally chosen their profession, but more must be secured from the ranks of the teaching corps in the state and from the number of those preparing to make teaching a career. The opportunities for the specialist in the teaching of the industrial branches are greater than in any other field of public school work, and will appeal to the wide-awake and ambitious. In my visits to teachers' institutes and to high schools, I have presented the matter in general discussion and by private interview. A number of students have already entered upon regular courses for the purpose of becoming special teachers. The courses offered in last year's Summer School were organized primarily for the benefit of teachers now in service who wish either to prepare to become special teachers of the industrial branches or to be able to help their pupils in the preparation for the School Industrial Contests.

The course of study for public schools in Oregon provides for instruction in elementary agriculture in the seventh and eighth grades, for which a textbook has been regularly adopted. This book is used chiefly as a supplementary reader and while the pupils doubtless receive some benefit in this way, it can hardly be called instruction in agriculture. U. S. Commissioner of Education E. E. Brown, in 1907, sounded a note of warning with regard to the danger of a "painful shortage of teachers of agriculture resulting in such a state of affairs that the public will lose confidence in any subject of instruction which is much more badly taught than any other subject in the schools." Some way must be found to vitalize this teaching at the earliest possible moment. The teachers in the public schools, though interested, are uninformed and untrained, and the heavy demands upon their time made by the other and older subjects crowd out the new branch.

The most approved experience in other states seems to indicate that the best solution is to have one or more special supervisors in each county, who will group the rural schools into convenient districts and devote the entire time to directing the instruction. At the same time, the teachers would receive instruction and training. The College must assist in the creation of sufficient public sentiment to justify the adoption of such a policy by county officers and must provide the supervisors. In time, the normal schools, colleges, and high schools, engaged in giving teachers' training courses, will have provided all the grade teachers with some technical training in the industrial branches, so that the work of the supervisors will be more effective. In the meantime, something must be done at once for the assistance and direction of the teachers now attempting to give the instruction provided by the state course of study in elementary agriculture.

Three Lines of Work.

At least three lines of work should be undertaken. First, the courses in the Summer School must be made available to the greatest possible number of public school teachers.. A strong effort was made last year to interest the teachers, with only partial success. Circulars and letters to school directors and commercial bodies were sent with the purpose of securing their co-operation in getting the teachers to the College. It was urged that such teachers should be offered the inducement of an increase in salary or the expense of attending the Summer School. While such action would undoubtedly greatly increase the teacher's value to the school, but little impression was made. If the present teaching force is to be used in teaching the industrial branches, some measure must be devised to give them the requisite preparation. If the School Law is to include agriculture, for example, as one of the subjects listed for teachers' examinations, as is already the case in a number of states, the teachers must be given an opportunity to prepare.

To read up in a text book, may fit them for the examinations but it will have little value in teaching. Such a law should permit the teacher to substitute directed study, preferably in residence at the College during the summer; but correspondence courses would also prove far superior to the pre-examination cram. It is to be hoped that our Extension Department will be able to announce correspondence courses in the immediate future. This is the second way in which immediate aid may be given in the solution of this problem. In every teachers' institute, many have expressed a strong desire to enroll in correspondence courses. It would be possible to form groups of teachers into clubs in various parts of the state, which could not only meet for discussion and mutual assistance but which could be addressed from time to time by instructors from the college.

The third line of work should be organized as soon as the facilities of the department permit, by the publication of outlines and a series of leaflets for the guidance of teachers and pupils in the use of the text book now in the State course of study for the elementary schools. It might be possible for the College to undertake directly the supervision of the pupils' work, to a limited extent, as a temporary measure until the teaching force in the public schools has had time to prepare for this duty. Blank forms for record of tests, experiments, etc., to be used in connection with the circulars and leaflets described above, would be sent to the schools and returned to the College, to be examined by readers and instructors assigned for the purpose, and then sent back to the pupils with corrections and suggestions.. Such a plan is in actual practice in one or more states at the present time.

A Senior Industrial Education Association was formed by students in attendance at the last session of our Summer School, composed of public school teachers and others interested in the promotion of industrial teaching in the public schools. City Superintendent J. S. Landers, of Pendleton, is the first president. Vice-presidents are being appointed in each county, who will be ex-officio presidents of the county associations, and who will direct the work in cooperation with the general State association. This organization should be of great value to such field workers as the College may be able to send out through the Extension Department for the purpose of advancing the movement for industrial education in the elementary and high schools. This Senior Society will also form boys and girls clubs and assist in the direction of their work.

Special Teachers.

The chief duty of the Department of Industrial Pedagogy, however, is the preparation of the special teachers for the secondary schools and for supervision of the teaching in the elementary grades, both in the town and country schools. It is reported by the State Superintendent of Public Instruction, L. R. Alderman, that over 400 school districts in Oregon are offering a year or more of high school instruction, with ten thousand pupils enrolled. About one hundred of these maintained four year courses. One hundred and fifty additional ones offer two or three year courses. It would be a conservative estimate to say that one hundred and fifty of these two hundred and fifty schools giving two or more years of high school instruction should provide some opportunity for industrial training. Doubtless within the next five years that many school districts in Oregon will be awakened to the necessity of such provision. Not all of these schools will feel able to employ special instructors who will devote all of their time to teaching the industrial subjects, but they will insist that their high school teachers must have had some special training which will enable them to use part of their time in such instruction.

All standard normal schools now give their students sufficient industrial training to enable them to teach the branches in the elementary grades and for a time these schools must also assist in preparing high school teachers who can at least work intelligently under expert direction. Other teachers will be available who have had professional courses following their graduation from high schools, where they have received industrial instruction. The special teachers, however, who will devote full time to industrial teaching and who will act as supervisors in the elementary grades of town and country schools, must receive a thorough technical and professional preparation in the colleges that specialize in the industrial subjects. This must be so, both in order that the instruction be competent to meet the demands of the public that the pupils be efficiently trained, and also in order that the instructors may be of equal rank with the highly trained teachers of the other branches. Industrial training must be placed on a par in dignity and worth with the other branches of the curriculum or it will not appeal to the ambitious and able pupils who are needed to make a success in these lines as well as in the professions.

For the preparation of these special teachers and supervisors alone, I have made the following estimate of the number required in our Oregon schools , who must receive their training in this institution if they get it in Oregon. Since the same demand for such teachers is arising in all the other states, we cannot expect much assistance from their technical schools.

(1) There are 25 four year high schools employing six to forty teachers each. The larger of these should have two to four teachers in agriculture, in manual training, in household economics and in commerce. The smallest should have at least two industrial teachers. This would make a total of say 100 industrial teachers. (2) There are 25 other four year high schools employing three to six high school teachers, in some of which two, and in all of which at least one industrial teacher should be employed, say a total of 40. (3) There are 25 other four year high schools employing the full time of two high school teachers, in which there should be room for say 15 industrial teachers (4) In the remaining 25 four year high schools, employing less than the full time of two high school teachers; in the 40 or more three year high schools, and in the 100 or more two year high schools, or a total of 165, there should be the possibility of combination with each other and with adjoining country districts in the employment of say 25 industrial teachers. (5) Every county should have at least one supervisor qualified to direct industrial instruction of the boys and one for the girls; some of the larger and more populous counties should have two or more additional, making a demand in the thirty-four counties of say 80 industrial supervisors.

Adding these five classes, we have an immediate need for 260 industrial teachers. With that number in service and the natural growth in population, we can safely estimate an annual demand for 50 new teachers. If these represent graduates, it would mean at least a department of two to three hundred students. By the present plan, these students are now registered in the several schools of Agriculture. Domestic Science and Art, Commerce and Mechanical Engineering. While I am still of the opinion that the degree should be conferred in these schools, the present arrangement of the catalogue does not give sufficient prominence to the pedagogical training. Furthermore, the courses listed by these schools are too specialized for the needs of secondary teachers, who are to give general instruction in the elements of the various industrial branches. I would recommend, therefore, that suitable four year degree courses be arranged by the several deans in consultation with the department of Industrial Pedagogy, and listed as are other courses in their respective schools.

Book and Exhibits.

The greatest immediate need of the department is an appropriation of at least five hundred dollars for books of reference on the general and special educational problems concerning industrial education, and a sufficient annual appropriation to secure the best of the current publications, of which an increasing number is being issued. Model equipment for the teaching of the different industrial subjects should also be installed, both for the benefit of the students preparing to teach and for the inspection of school superintendents and boards of education. This equipment would be used in the instruction in the secondary courses of the College, which would thus provide a model school and to a limited degree might also afford practice teaching for the students in Industrial Pedagogy.

Extension Work.

If it is deemed advisable to undertake the direction of the introduction of agricultural instruction into the rural and graded schools where no special teachers are employed, it would be necessary to provide clerical service at the College and the time of one or more instructors in the field. This work might be combined with the beginnings of correspondence courses for teachers and others who would be compelled to carry on a part of their study in this way in preparation for becoming specialists in industrial instruction. The School Fairs organized and conducted in every county in the State last year aroused great interest. Their educational value will depend upon the ability of the public school to give instruction and guidance to the pupils in their industrial contests. In fact, if the school does not actively and intelligently direct this phase of the pupils' activities, it will result in weakening the confidence of both pupils and parents in the ability of the school to meet the practical needs of its patrons. The College must assist the teachers in meeting those demands through correspondence courses, summer school instruction, and by sending representatives into the field to reach both teachers and pupils in their communities.

It would be of eminent service to the State to have erected a special building, which would be a model for the average city and town school in the State, in which the required laboratories, work shops and equipment could be installed for good elementary and secondary courses in the industrial branches. The regular buildings and equipment of the College are on a scale required by the advanced instruction given, and are also now fully occupied for that purpose. The numerous imperative needs of the institution at this time will doubtless preclude the possibility of securing such a building for the ensuing biennum and so it does not appear in the detailed summary.

The movement for the re-organization of the course of study in the public schools is national. The demand comes from the great business and labor organizations and involves not only our commercial prestige but our social life as well. The people of Oregon look to their Agricultural College to take the lead in the movement. The formulation of the courses, their correlation with the other subjects in the curriculum, the securing of practical results from the instruction, and in a vital way the preparation of competent teachers, must all be done on sound educational principles. The service which the College is to render the state in this field is not a small one.

Respectfully submitted,
E. D. RESSLER,
Professor of Industrial Pedagogy.

REPORT OF THE DEPARTMENT OF PHYSICAL EDUCATION.

To the President of the College:

Sir: I beg leave to submit the following report of the work in this department, reviewing what has been done in the past two years, and sketching the plans and needs for the next biennium.

In submitting suggestions for the proper development of this department, I beg leave to state that the present efficiency of the work is not a fair indication of the department's possibilities for good; first, because of the almost total lack of equipment, and second, because of the lack of available periods for the work, resulting from a congested building.

Two years ago the enrollment of sub-freshmen, freshmen and sophomores for required gymnasium work totalled 450. In 1911 the enrollment was about 600; while in the fall of 1912 about 800 men reported for the work.

Extent of Work.

The department of physical education supervises all gymnasium and athletic work, subdivided as follows: Regularly scheduled class work on the gymnasium floor for 800; All play-ground work, including out-door health building classes; Athletics, including college foot ball practice daily between the hours of four and six, with fifty students; Basket ball practice daily with sixty candidates; Inter-class foot ball with probably eighty participants; Inter-class basket ball with forty participants; Inter-class wrestling with as many as twenty participants; College base ball with sixty candidates; Inter-class base ball with about fifty participants; Inter-department base ball with forty-five in the squad; College track practice daily with fifty in competition; Inter-class and inter-department track practice with probably as many as seventy-five participants; Tennis teams for different organizations with fifty men in the lists. Add to this number of students those who visit the gymnasium or athletic field only occasionally for individual practice, and it will be observed that as many as six hundred and fifty students avail themselves of the opportunity to participate in one or more branches of the more vigorous sports.

Faculty.

A Director of Physical Education, a Professor of Physical Education for Women, an Instructor in gymnasium work for men, an Instructor for Women, and a Coach for foot ball, constitute the instructional force.

An assistant instructor for men should be added to this corps of instructors, a man who should replace the student assistants employed at present, and who should assume, in addition to his work in relieving the crowded condition that now exists in gymnasium classes, the responsibility of coaching one of the out-door sports, base ball for instance, or track team work.

Necessity for Systematic Athletics.

In this age of modern methods of education, modern systems of business, and modern habits of living, great stress is being placed, both in the United States and other progressive countries, on the general symmetrical development of the young man by educational institutions. Symmetrical development includes, of course, proper care of the student's physical needs in conjunction with the development of the mind. Great emphasis is being placed upon the resposibility which rests upon the authorities in charge of the physical preparation of young men and women in our educational institutions. Statistics gathered by the authorities of our bigger and more modern colleges and universities, go to prove that scientific care of the health of students, and attention to corrective and medical gymnastics that physical examinations show are needed, have changed the average of student health for the better to the extent of forty per cent.

The added efficiency which such general health improvement must give is applicable only to such institutions as have adequate facilities for conserving the health of their students. These institutions are generally eastern colleges, where the average student is a graduate of a four year high school, an advanced academy, or normal school, in all of which students have already had considerable aid in general health and body building. Here in Oregon, however, a majority of the high schools have as yet made no provision for systematically developing and maintaining the health of their students. How much more urgent, therefore, is the demand for efficiently meeting the needs of the students in the Oregon Agricultural College, who come, for the most part, from high schools without any facilities for physical education. How much more urgent the demand, and how much more beneficial the work.

Peculiar Needs of the College for Physical Education.

The Oregon Agricultural College has needs peculiarly its own in handling physical education. Probably seventy per cent of the students reach college without having had the least experience in exercising proper care over their bodies, or in living up to a standard of requirements for correcting improper postures, habits etc., to say nothing of maintaining progressive and corrective gymnastics. While the other thirty per cent have had physical education, indeed, this may have ranged in character all the way from beneficial to positively injurious. It can thus be seen that if the work is to reach a satisfactory standard within the next few years, the task of the department of Physical Education at the College is a heavy one, even granting that facilities were available for carrying out the work.

Facilities Inadequate.

The facilities, however, in respect to building, athletic field, and equipment, are altogether inadequate. The gymnasium, in the first place, is so congested as to damage the continuity and integrity of the work. Almost eight hundred boys and three hundred girls are at present reporting to the instructors for work which is listed in the catalogue as "required." Because of the division of periods between the men's and women's departments, owing to the natural objection to any plan which would bring both boys and girls upon the floor for exercises at the same period, each division of the department is forced to acccpt a share of periods less than half what is ordinarily required for corrective, progressive, and medical gymnastics.

Owing to the condition which forces a division and even subdivision of periods, for instance, there are certain of the men's classes in which are grouped as high as one hundred and fifty students, ranging from second year secondary students, to juniors. It can readily be seen, therefore, that it is physically impossible for an instructor, or even a corps of instructors, efficiently to care for so large a class of students, seventy per cent of whom are in need of personal and individual attention.

As a result of the crowded program of daily classes, practice in basket ball for the regular college squad, an important phase of college athletics, has to be relegated to the evening, an unjust arrangement for busy students.

Added confusion is brought upon the department because of the fact that the College has no other building available for an auditorium, or for holding student meetings, college convocations, and evening entertainments such as lectures, association programs, class parties, and student and faculty balls. When the time required for preparing the gymnasium floor for convocation and similar meetings, or for decorating for various social functions, is deducted from the periods which should be utilized for gymnasium classes, it is evident that little work of a progressive nature can be instituted.

New Gymnasium Needed.

With a student body approximating eighteen hundred young men and women, all of whom require more or less attention along lines of hygiene, medical examinations, gymnastics, and healthful outdoor games, it is the plea of the Director of Physical Education that an earnest endeavor be made to secure funds to erect a new gymnasium for men, and to provide an adequate and efficient athletic field.

The present building was erected, at a comparatively low cost, nearly twenty years ago. At that time, the enrollment of the entire college comprized only about 400 students, and physical education had not yet reached the stage of its development when its importance was emphasized, or even recognized, as it is today. The building is inadequate not only in floor space, but in ordinary essentials such as rooms, fixtures, and equipment. There are but 500 lockers in the men's locker room, while there are eight hundred men to use them. There are even fewer lockers, in proportion to the number students using them, in the women's locker room. This means that there are often two, three, and even four or five students using the same locker, a condition which is so embarrassing, unsanitary, and unhygienic as to be deplorable. In many instances it is necessary to apportion a certain locker to students who are unacquainted with each other, a situation which often provokes decisive objections against conditions which make this necessary.

A Menace to Health.

In the winter of 1911-12 Corvallis was suffering from a smallpox epidemic of more or less severity. In several instances the head of the department detected incipient cases of small pox among the students. In taking the proper precautions against a spread of the disease, it became necessary to fumigate the entire gymnasium, shutting it up for at least twenty-four hours, because of the unavoidable confusion existing over locker apportionments.

This is but one instance, among many that might be cited, to emphasize the immediate need of help from the authorities for proper protection of the health of the student body. This help should come in the form of a new and modern gymnasium building, erected and equipped for the special functions of physical education.

The present building, with proper adaptation, which would involve no great expense, would be adequate for use as a gymnasium by the women of the College.

Athletic Field.

In considering the needs of physical education, it is important that the facilities for conducting out door sports be considered. The present athletic grounds are too small, swampy, and unfit. They are becoming a by-word and a disgrace to the College. Newspapers, in accounts of last fall's games on our field referred to it as a "sea of mud", and a "quagmire." Athletic Director Archie Hahn ,of Whitman College, during the progress of the O. A. C.-Whitman football game of November 16, declared with decision, "Had we known of the condition of your field we would not have left Walla Walla, but would have forfeited the game. It is the last appearance of the Whitman teams in Corvallis until improvements are made in your athletic field."

There is no drainage for the field, no fence surrounding the field, only a temporary make-shift in the nature of a grandstand and bleachers; the ground is swampy, the field equipment generally dilapidated, and as a consequence even the college teams are disorganized and handicapped by lack of proper training grounds.

It is therefore strongly urged by the department that provision be made for a suitable athletic field, such as to permit the department to establish the standard in out door activities which the prowess of such an institution as O. A. C. deserves.

Respectfully submitted,
E. J. STEWART,
Director of Athletics.

REPORT OF THE DEPARTMENT OF PHYSICAL EDUCATION FOR WOMEN.

To the President of the College:

Sir: I have the honor to submit to you the following report:

The greatest intellectual development and efficiency in life can only be attained with perfect physical condition. It is the aim of this department, therefore, to provide for all girls in the college systematic physical exercises of such different sorts as shall be best adapted to the personal needs of each individual. As far as possible a study is made of the condition of every girl; and proper physical training, a careful all-around development, and the correction of the physical defects of each individual, is made the basis of all work in the department. Correct breathing, posture and carriage are given the greatest emphasis.

Courses.

For those in good physical condition, courses in elementary or intermediate gymnastics are prescribed. The day's lesson includes (1) tactics or a setting-up drill; (2) exercises, free-hand or with light hand apparatus (wands, dumb bells, or Indian clubs,) arranged so as to include in proper order all the large groups of muscles; (3) simple apparatus exercises, and (4) for the more recreative part of the lesson, at the end, fancy steps or a game.

For those in poor physical condition, on account of bad postural defects, functional disorders, or organic weaknesses, corrective and medical gymnastics are prescribed, according to the physical needs of each individual as indicated by a careful physical examination. Private work and individual attention are given in difficult cases.

Elective work for all physically qualified is offered in outdoor Sports, Basket Ball, Swimming, Aesthetic and Folk Dancing. In these classes the natural love for play, for competitive games, for music and rythm, are encouraged, yet always the underlying principles of Physical Education, in the best sense of the word, are kept in mind.

After each period of exercises, and before the student goes out of doors, a shower bath (with warm water first, then cold), and a vigorous rub are required.

Courses Physical Education for Women.

Total Enrollment, 317.

Course	Division	No. in each Division	Periods Required
Elementary Gymnastics	A	43	2
" "	B	45	2
" "	D	77	2
Intermediate Gymnastics	A	45	2
" "	B	33	2
" "	C	21	2
Corrective Gymnastics	A	44	1
" "	B	12	1
" "	C	13	1
" "	D	19	1
" "	E	10	1
" "	F	11	1
Special Corrective and Medical Gymnastics	Special	Varies	Varies
Aesthetic Dancing		103	2
Folk "		60	1
Outdoor Sports	A	42	1
" "	B	19	1
" "	C	30	1
Basket Ball		35	1
Elementary Swimming	A	6	1
" "	B	12	1
" "	C	12	1
Advanced "	D	20	1
Elementary "	E	13	1
" "	F	17	1
" "	G	15	1
Advanced "	H	20	1

The individual physical examinations of the students show that a large percentage of the women of the College are in serious need of medical and corrective gymnastics. If facilities for offering such gymnastics are provided, a very large proportion of these physical defects, within the two years of prescribed gymnasium work, can be effectually corrected.

Two Periods a Week Requirements.

Instead of four periods a week, as prescribed in our best college departments for women at the present time, we are requiring but two periods in Physical Education. This is entirely wrong from the medical standpoint. Muscular soreness and a relapse into faulty standing position and sedentary habits are inevitable results of long intervals between classes. It has been found by careful investigations and experiments, that the best health of women students with lasting effects upon their muscles, necessitates that four periods a week in systematic physical exercise should be required of each college girl. This is necessary in order that bodily functions should be properly regulated and defects corrected. Wellesley College and the University of Wisconsin are best demonstrating the work that should be accomplished, showing remarkable results. Their departments of Physical Education for Women serve as practical ideals to other departments yet struggling to be of highest service to the young women in their charge.

On account of our lack of space and time, a compromise might be made and a minimum of three periods a week be required of all women students during their first two years of residence. Nothing less than this, however, should be considered.

Difficulties in Carrying on the Work.

In order to conduct a first-class department of Physical Education for the women of the college, both place and time must be allotted for the classes. The present gymnasium is entirely inadequate in size, plan, and equipment. Every phase of the work is handicapped by the lack of suitable quarters or apparatus. For example the girls have the use of the gymnasium for but three afternoon periods during the entire week. This eliminates for many the chance for systematic exercise in their recreative hours from four to six o'clock; and if they have no vacant morning periods obliges them to make use of the noon hour from twelve until one o'clock, a most undesirable time, because of fatigue and hunger, for physical training. This affects much value as well as the popularity (which is important) of the work. At present, not a single corrective class has the use of the gymnasium alone. The boys are on the floor at the same time that the girls, in a corner of the gallery or on the porch or roof, are given whatever exercises are possible where there is neither privacy nor proper apparatus. The importance of the corrective work cannot be overestimated; so great results are possible as to change the entire lives of many girls. A corrective room with proper apparatus and a rest room in connection, is essential. For girls in poor physical or nervous condition, after special exercises or massage, relaxation movements and rest should be taught as carefully as any other course in Physical Education. In the University of Wisconsin, great importance is given the "rest classes," and we have continued need for them here, but no place.

Lack of Proper Apparatus.

There is almost no apparatus in the gymnasium which is adapted to the use of the women. The little that is up-to-date and adjustable is in such small quantities that it is impossible to use with classes of the present size in the short periods allotted the work. Some of the most important exercises, therefore, for remedial work, both in the regular and the private corrective classes, have to be omitted. Lists of apparatus necessary for good work are given in the requisitions.

Lack of a Good Swimming Pool.

If the department of Phycical Education could do the work that should be required of it by the state, no student would be graduated from the college who had not a good posture and could not swim. The girls here are enthusiastic, willing, and anxious to learn, but many cannot endure the conditions imposed by the present swimming room in the basement of Shepard Hall, the Y. M. C. A. building. It is not properly heated, lighted or ventilated. The water is too cold for the majority of girls, and the pool is entirely too small for the numbers using it. Moreover, for girls taught in classes, not by private and individual instruction, simple apparatus is necessary for good work and economy of time. For the four classes taught in succession with numbers varying from six to twenty, there are only five small dressing rooms. These have no drainage, nor has the corridor outside. The whole place, in fact, is dark, cold, and unsanitary, in spite of all that we can do to make it otherwise.

Lack of Office, Conference and Examination Rooms.

At present the professor's office is so small that it cannot accommodate those waiting for conference, nor can private exercises be given in the space, nor private interviews be held unless all others are inhospitably turned out upon the cold, boy-crowded gymnasium floor. A comfortable outer office should be provided as soon as possible.

The instructor's office, suitable and needed for that purpose alone, is also being pressed into a triple service. It is used by the young lady employed as assistant (in the locker room and for office work,) as well as for a physical examination room. Here again is present the difficulty of giving the girls the privacy needed for interviews on the medical side of the work.

In addition to the regular work in Physical Education, the department is attempting to fill another urgent need. As there is no college hospital, the professor and instructor in Physical Education fulfil many of the duties performed in other colleges by the resident nurse and physician; for instance, give many hours every week to the dressing of wounds, emergency work, treatment of sprains, headaches, massage, as well as to interviews with students concerning their physical ailments, habits, diet, etc. All this is done willingly but necessitates more office room for treatments and conferences.

Congestion in the Locker and Shower Bath Rooms.

Just as important as the exercise are the baths following, yet there are but eleven showers in all, though in one elective class alone are enrolled one hundred and three girls.

For three hundred and seventeen enrolled in the department at present, there are but eighty-six lockers. These are not ventilated, and are fitted with locks and keys of such cheap mechanism as to be continually out of order. The result is that four,(and when keys are out of order,) even five girls have to use a single locker, which is nubearably crowded with suits, shoes and underclothes.

On account of the misplacing and loss of articles, together with the trouble caused by the loss and bending of keys, much valuable time of the teachers and the attendant is uselessly expended.

Respectfully submitted,

MIRIAN THAYER,

Professor of Physical Education for Women.

REPORT OF THE DEAN OF WOMEN.

To the President of the College:

Sir: The policy of this department is to work in cooperation with the other departments of the College in such a manner as to educate and train, most effectively, a body of young women. It is the aim of the department to develop a superior type of young womanhood. In striving to do this, it is the plan of administration to give plenty of good counsel, but no commands; to be helpful to the women of the faculty, the alumnae, and the undergraduates.

Improved Attendance of Women.

During the year 1911 12 there was a considerable increase in the number of women students, as well as distinct improvement in the quality of womanhood represented. This fact may be attributed, doubtless, to the higher requirements for entrance to the degree courses, as well as to the enlarged place the College now holds in the life of the State.

Work of the Department.

The head of the department endeavors to meet each young woman personally at various times during the year. Aside from personal interviews, a number of lectures are given, the aim of which is the physical, moral, and spiritual development of the young women.

Lectures and council meetings have been scheduled for 1912-13 at which such questions will be discussed as cardinal points of good manners at table, in school, at the telephone, etc; correct carriage, proper position in sitting and standing, as factors in health, and a means to physical beauty; best forms of dress for various occasions, the construction and balancing of a desirable daily program of work and recreation.

Aside from this, all women in the college have the privilege of attending the regular freshman course in Social Ethics and Hygiene. The latest and best literature along this line of work is selected and placed in the college library.

In response to the request of the young men, evening classes were formed for the purpose of imparting knowledge to the college men.

Receptions, socials, dancing parties, chafing-dish-parties and other amusements are planned and given by the young women under the supervision of the members of the staff of this department. An annual reception is given to all women connected with the college, by Mrs. W. J. Kerr, wife of the president, and the head of this department. The expenses of a number of these social affairs have been met by a generous gift from Mrs. Clara H. Waldo, member of the Board of Regents.

Under the direction of the Y. W. C. A., Bible and Mission study classes are held, to which all young women are eligible. Among the women students there are a very large number, who hold membership in some church. Students are urged to attend divine services, and we find the various churches of the city very helpful in directing the spiritual life and affording helpful amusement for the young people.

Attention to Health.

The healthfulness of our situation and our pure mountain water preclude any serious illness. Last year, with the assistance of the Board of Health, we were quite successful in handling contagious diseases. This year, we hope to carry on some very valuable co-operative work with the departments of Physical Education and Bacteriology in handling diseases among the students.

Need of Another Dormitory.

The crying need of this department is more and better housing for the women students. Just how far their requirement can be met in the near future is a matter of grave concern to the department. Heretofore, all of the young women that so desired have been accommodated in Waldo Hall,. For various reasons some of the students prefer to live in private homes; some working for room and board, others requiring special diet; while a number live with their parents, who come to Corvallis for the school year in order to be with their children. Waldo Hall accommodates comfortably one hundred and seventy students. Heretofore the applications for rooms have never exceeded that number. This year, up to September fifteenth, one hundred and ninety seven applications were received. Since that time, every week a number have applied for rooms.

This department, working with the committee on domiciles, has tried to solve the problem of housing the women, by placing those who could not be accommodated in Waldo Hall in approved boarding places in the city. Owing to the fact that so few suitable rooms were available, it was deemed advisable to take more women into the dormitory. In order to do this, it was necessary to secure additional equipment, furnishings and labor. Owing to the necessarily crowded condition, we find it impossible to maintain the system heretofore employed, the effectiveness of which we feel has been amply demonstrated.

It is the desire of the department that the life of the young women of the college be sane, reasonable, and high minded. The present condition of affairs in the dormitory makes it less possible to reach this ideal; for the present dining room, kitchen, store room, and bath room accommodations are not adequate for the number of people in the building.

This year the number of women registered in college up to date is 376; the number living in the dormitory is 185; the number living in homes is 112; while the number living in boarding houses is 79.

Present indications assure us that there will be a great increase in the number of women students for 1913-14. Therefore, we recommend that steps be taken by the college to provide additional dormitory accommodation for its women students; we suggest that these accommodations be in the form of one or more buildings on the campus, to be ready for occupancy at the opening of the school year 1913. This will require the employment of such persons as will be needed to care for the additional dormitory accommodations.

Respectfully submitted,
ANNA Z. CRAYNE
Dean of Women.

REPORT OF THE EXTENSION DIVISION.

To the President of the College:

Sir: I am submitting herewith a report of the work done under the direction of the Extension Division for the latter part of last biennium and recommendations for the development of the work during the next biennium. I have confined the report of extension work done to the period during which the Extension Division had superivision. This period dates from November 8, 1911, to November 1, 1912.

Nature of Extension Work.

Extension service is such a new factor in the field of educational endeavor that there is still a great deal of uncertainty as to its nature and scope. This confusion is present not only in the public mind, but, also, to a certain extent, in the minds of many who are engaged in educational work. For this reason I am taking the liberty of writing into this report the clearest and most authentic definition of the ideals, the field, and the methods of extension service which has been made up to date.

The following excerpts are taken from the proceedings of the twenty-fifth annual convention of the Association of American Agricultural Colleges and Experiment Stations. The first is from the report of the committee on college organizations and is printed on page 71 of the report. The other excerpts are from the report of the committee on extension work and may be found on pages 34 and 35 of the same report.

1. "The activities of the land-grant colleges should be organized and administered through three coordinated departments, namely college instruction, experiment station, and agricultural extension. Each of these should be separate in its duties and resources, but all work in unison.

(a) "The department of instruction should be responsible for all teaching at the college, and this should be made to conform to the accepted college standards. Teaching of secondary grade should be separated from this department.

(b) "The experiment station should devote itself to the study of agricultural problems, without responsibility for the popular dissemination or application of the results.

(c) "The department of agricultural extension should be charged with all extra-mural teaching and demonstration, and, for the present, at least, the supervision on behalf of the college of secondary agricultural training in the public schools.

2. "There are at least five reasons why a comprehensive extension service should be developed at the agricultural colleges.

(a) "It is important in itself. There must be some method by which the masses of the farmers may be reached.

(b) "It is logical. It follows naturally on research.

(c) "It is inevitable. The people regard the agricultural college as the prime source of their information.

(d) "Extension teaching is vital to the highest development of the college itself.

(e) "Extension teaching is the best means by which the college may act as a clearing house for those activities designed to better country life as a whole."

I. A GENERAL STATEMENT OF THE WORK OF THE PRESENT BIENNIUM.

The Extension Division of the Oregon Agricultural College, since its organization on November 8, 1911, has "carried the college" to 129,569 people of the state by means of (1) Institutes, (2) Demonstration Work, (3) Correspondence Courses, (4) Judging at Fairs and Shows, (5) Extension Work in the Public Schools, and (6) Promotion of Organizations for Agricultural and Industrial Improvement. This report makes no attempt to estimate the large additional number of people reached indirectly by means of (7) Extension Bulletins, (8) Instructional Exhibits, and (9) Press Bulletins, all of which are popular channels of instruction used very effectively by the College.

This work has been made possible through the cooperation of 43 members of the College faculty and Experiment Station staff, and by the service of two field agents, employed through aid from the State Bankers' Association and the Portland Union Stock Yards Company, and both assigned to the extension staff of the College.

By far the greatest part of the extension work mentioned in this report, however, has been done by regular members of the college staff, in addition to their regular routine of college duties. The work done by the two special field agents has been limited to the public schools of the state and is specifically attributed to the field agents in this report under the head of "Extension Work in the Public Schools."

Institutes.

Institute work directed by the Extension Division of the College falls under three heads; viz, Farmers' Institutes, Teacher's Institues, and Special Institutes. The first two classifications are self-explanatory. Under the head of Special Institutes is included all extension work done in connection with Special Organizations (such as growers' unions, development leagues, etc.) (12); Commercial Clubs (10); School Commencements (10); Grange Picnics (9); Churches (6); Chautauquas (4); Banquets (4); Social Clubs (4); Conventions (4); Y. M. C. A. (2); (Arranged in order of number of meetings attended, which numbers are indicated by figures in parentheses.)

For convenient reference, the report of all institute work done since the organization of the Extension Division is given the following tabulated form:

Classification	Number	College Speakers	Days	Attendance
Farmers' Institutes	72	119	127	8,741
Teachers' Institutes	6	8	21	450
Special Institutes	45	62	104 1-2	17,745
	123	189	252 1-2	26,936

Demonstration Work.

Under this head is reported extension work prosecuted by (1) railroad instruction trains and by demonstrations given on (2) private farms and at (3) public gatherings.

1.-A poultry demonstration car was equipped by the College and operated over the Southern Pacific Lines in the Willamette Valley. It was on the road from April 6 to May 4, 1912, stopped at 50 towns and was visited by 21,932 people.

2. Demonstrations were given in pruning, and in the manufacture of lime-sulphur spray at six orchards in the state. Four instructors did the work, which took seven days time and reached 450 orchardists.

3.-Public demonstrations were given at the State Fair, at three granges and at four high schools. On account of the nature of such demonstrations, and the shifting crowds which attended, no record of attendance is obtainable.

Correspondence Courses.

Under extension supervision instruction by correspondence is offered, at present, in three courses (1) Farm Accounting, (2) Rural Law, (3) Rural Economics, all of which courses are grouped under the title of "The Farmers' Business Course". The enrollment now numbers 31 and three instructors have spent time aggregating 30 days during the last year in handling this work.

Requests pour into the office of the Extension Division for correspondence courses in other subjects, the greatest demand being for courses in the various agricultural subjects, domestic science and domestic art. These courses cannot be established until an appropriation is available for correspondence course work.

Judging at Fairs and Shows.

The phase of extension work which has reached unprecedented proportions this year is that of placing the awards at fairs and at other competitive exhibitions throughout the state. The requests for such service have been greatly in excess of the number the college was able to satisfy. In this service, during the past year, the college has sent its experts to 37 fairs and similar exhibitions. Sixty-seven individuals furnished the service, putting in a total of 97 days (including time spent on the road). This work was done at county and district fairs, grange fairs, school fairs, poultry shows, stock shows, potato shows, etc.

Extension Work in the Public Schools.

The most important and far reaching public school work accomplished by the college has been in conjunction with the State Superintendent of Public Instruction along the lines of promoting the industrial school fair movement. In the field, the Extension Division was represented by N. C. Maris and C. C. Thomason, who, during the nine months time which each gave to the work, visited the schools of every county in the state and gave instructions to 41,105 school children relative to the preparation of exhibits for their respective school fairs.

The work of the two field agents was supplemented by the assistance af 3 faculty members who devoted 15 days to preliminary work in connection with the promotion of the industrial fairs and reached 7,035 school children in addition to those reported above, thus making a grand total of 48,140 public school children directly influenced by the college during the industrial fair campaign.

In connection with this movement the College has published and distributed three Extension Bulletins; viz, Series 1, Number 1, "Oregon Boys and Girls," 50,000 copies. Series 2, Number 1,, "Oregon Boys and Girls and the Egg problem," 50,000 copies. Series 2, Number 2, "Prize Winning Pigs for Oregon Boys," 50,000 copies.

Extension instruction, in the nature of class room lectures and demonstrations, has been given on 25 different occasions in 21 high schools of the state, 24 1-2 days having been devoted to this work by members of the college staff.

A new demand for extension work in the high schools has sprung up this fall in the form of requests for college experts to appear as lecturers before meetings of literary societies, and meetings of school patrons.

Promotion of Organizations for Agricultural and Industrial Improvement

In order to unite the leaders throughout the state who are zealously working for the advancement of scientific agriculture, and direct their efforts in channels which seem to assure early and beneficial results, the College has promoted the organization of "The Oregon Agricultural Experiment League" and "The Senior Industrial Education Association."

The Oregon Agricultural Experiment League is an organization advocating cooperative experimentation, under the direction of the college experts, as a means of solving the problems of practical agriculturists. Its object, as stated in the constitution, is "to further every branch of agricultural interest in the state of Oregon by means of experiments, tests, and the collection of agricultural data" and "to report and disseminate the results of experiments and tests, and the knowledge obtained therefrom." The League was founded during the winter of 1911. It now has 120 members representing every phase of agricultural industry in Oregon, and through the Extension Division these wide awake experimenters are kept in touch with each other and with the college experts.

The Senior Industrial Education Association is of more recent birth, having been founded at the close of the 1912 summer session of the Oregon Agricultural College by a group of progressive Oregon educators. The object of the organization is to "promote industrial education, including agriculture, domestic science and art, manual training, and kindred subjects in the schools of the state, to the end that Oregon boys and girls may be educated to take an active and effective part in the substantial advancement of our commonwealth."

Publication of Bulletins.

The bulletins enumerated below have been published in the furtherance of the work of college extension:

Extension Series 1, Number 1 "Industrial Contest for Oregon boys and Girls". (50,000 copies).

Extension Series 2, Number 1-"Oregon Boys and Girls and the Egg Problem".-James Dryden, (50,000 copies).

Extension Series 2, Number 2-"Prize Winning Pigs for Oregon Boys".-E. L. Potter, (50,000 copies).

Extension Series 7, Number 1-"Breeds of Chickens"-James Dryden, (2,500 copies).

Extension Series 7, Number 2 "Housing of Chickens-" James Dryden, (2,500 copies).

College Bulletin Series 1, Number 65-"Camp Cookery," Ava B. Milam and Ruth Smith, (500 copies).

Press Bulletins.

A news Press Bureau has been established which furnishes material to the newspapers of this state, to many magazines throughout the United States, and especially to the agricultural magazines and such other publications as are concerned with industrial work. During the last year news stories to the number of 1,237 were sent out from the Bureau. Many of these were mimeographed and sent to the entire list of papers and magazines. In addition to this the Bureau sent out during the past year 180 special articles illustrated by photographs and cuts. Within the past month the Bureau has established a regular printed press bulletin.

This service is offered for three reasons: (1) to account to the people of the state for the conduct of their institution, (2) to advise them of the various ways in which their institution is ready to serve them, and (3) to give them helpful information and instruction.

In performing this public service, the newspapers have been in complete cooperation both in motive and in fact.

Instructional Exhibits.

A valuable phase of extension service performed by the college is in the form of instructional exhibits and demonstrations made at fairs and other meetings where large numbers of persons are gathered. Extensive exhibits have been made during the past year at the State Fair and at the Portland Land Products Show. There have also been a number of smaller exhibits sent to county fairs and various conventions.

Demonstration Orchards.

The division of Horticulture is now operating, as a part of the extension work, two demonstration orchards located at Estacada and Molalla, both being in Clackamas County. The orchards are of ten acres each.

These orchards are being used primarily for two purposes: (1) to demonstrate commercial conditions; (2) to demonstrate variety adaptability. As a matter of fact. however, they are also used for temporary and oft repeated demonstrations in pruning, spraying, pollenization, etc.

The contract made with the owners of these orchards gives the College supervision over the tracts for a period of ten years. Professor Lewis considers the work done at these demonstrations to be the most valuable type of demonstration work in horticulture, and recommends that similar orchards be established at such places throughout the state as will make them of greatest service in carrying forward the extension work in horticulture.

Demonstration Farms.

This report does not include work done on demonstration farms during the past year as such work has not been specifically assigned to the division. The report carries a recommendation that this be done as soon as the division is equipped to take over this work.

Extension Staff.

The highest efficiency in the prosecution of the extension work has not been possible to date because there is no fund available for the establishment of a regular extension staff. During the past year the extension work has been done by a director, giving two-thirds time; a secretary, giving two-thirds time; an editor of press bulletins, giving full time; an extension clerk giving full time; two field agents, whose salaries and expenses were paid by the State Bankers' Association and the Portland Union Stock Yards Company, giving full time, and 43 members of the college faculty and station staff who have gone out from the college for lectures, demonstrations, judging, and other extension service at such times as their service was demanded and as they were able to leave their regular work. In addition to this the division has had the hearty cooperation of Mr. E. T. Judd, Deputy State Dairy and Food Commissioner, who assisted the College experts in eleven different institutes.

Summary of the Work Done by Members of College Staff.

A summary of work done by members of the College faculty shows that 66,342 people were reached by 43 bone fide members of the college staff on 219 institute trips made since last November. In coming in contact with this number of people, 29 counties were visited, 281 public gatherings attended, and time, aggregating 464 days, was de voted to the work.

In the nine months which Mr. Maris and Mr. Thomason worked under the direction of the Extension Division, they visited the schools of every county in the state and gave instruction to 41,105 school children relative to the preparation of exhibits for their respective school fairs.

Combining the number of people reached by the college staff(66,342) with those met by Messrs. Maris and Thomason (41,105) and adding those who visited the poultry demonstration car (21,932) and, also, including correspondence students (31), and members of the organizations promoted by the Extension Division (159), the grand total reaches 129,569 Oregonians who have been directly influenced by the college through the activities of the Extension Division during the last yeor. The aggregate time devoted to the work was 1113 days.

Funds.

The only fund available for extension work during the past biennium was $2,500 annually appropriated by the state for farmers' institutes.

During the past year the railway companies have furnished transportation free to those persons who were doing farmers' institute work and other lines of agricultural extension work. Thru this very liberal aid it has been possible to do three times the amount of work which the Division could have done without this aid. The Extension Division wishes to express its appreciation of this splendid cooperation on the part of the railway companies and respectfully to petition that such assistance be continued in the interests of the industrial development of the state.

The work reported above as done during the past biennium has been accomplished only by heavy sacrifices on the part of the various members of the College and Station staffs, whose regular work is all they should be expected to carry. The extension work has been treated thus far as emergency work, but the demands have become so great as to make it impossible to carry it longer without special provision.

II. STATEMENT OF PLANS AND REQUIREMENTS FOR THE NEXT BIENNIUM

The Scope of Extension Work.

Extension service must provide the following agencies: (1) Farmers' Institutes; (2) Itinerant Schools; (3)

Demonstration Trains; (4) Special Lectures in the schools and in cooperation with the granges, commercial clubs, Y. M. C. A's, and other organizations; (5) Correspondence Courses; (6) Boys and Girls Clubs for the study of industrial subjects; (7) Teachers' Associations; (8) Rural Improvement organizations among the adult population of the rural districts; (9) Cooperation with the granges, farmers' unions, and other organizations now in existence; (10) Rural Life Conferences, etc., for the discussion of better methods and better rural conditions; (11) Press Bulletins as described above; (12) Popular Bulletins and Leaflets which will give usable and practical information in simple, clear form; (13) Educational Exhibits which can be sent to the various fairs and other meetings; (14) Demonstration work such as will be carried on in connection with demonstration farms, demonstration orchards and co-operative work with farmers throughout the state; (15) Cooperation with such county and district advisers as may be provided by the state and the counties.

Subject Matter.

The subject matter of extension service will cover a field as extensive as the work of the College. It will deal with all information which will aid in the betterment of (1) farming methods, (2) the distribution of products, (3) the construction of roads, (4) the rural schools, (5) social conditions, (6) moral conditions, (7) the home, and (8) all other subjects having to do with the uplift of the rural community. Extension service of the land grant college must also take up the problems of all lines of industrial work, such as (9) the various phases of mechanic arts, (10) mining, the use of rocks and clays, (11) commercial lighting and wiring and the application of the principles of electrical engineering, (12) gas and steam engines, machinery, etc., and every adaptation under prevailing conditions, (13) surveying, highway construction, etc. (14) forestry and (15) the great field of the home problems with which the new home science is concerned.

In brief, the subject matter of extension service is only limited in its scope by two conditions: (a) the amount and character of the information the College is ready to disseminate (b) the kind of information which lends itself to extension methods.

Extension Staff.

In order to make possible the execution of the work along the lines suggested above and to such an extent as to meet the urgent demand now being made upon the College, the following staff of officers and instructors should be provided.

Director of Extension, Secretary of Extension, Editor of News Bulletins, one instructor in agronomy, one half-time instructor in agronomy, one half-time instructor in poultry, one instructor in animal hubandry and dairying, one instructor in domestic science, one instructor in horticulture, one half-time instructor in horticulture, one instructor to do secondary school work and develop boys and girls club work, one secretary of correspondence study, one organizer for club work and to prepare and handle all exhibits, one superintendent of demonstration farms, six stenographers and clerks, and extra assistance such as labor on demonstration farms assistance in short course work and itinerant schools. Estimated salaries, $26,720 per year.

Equipment.

The following list of special equipment is necessary for the prosecution of the work during the next two years: Typewriters, desks, files, chairs, mimeographs, multigraph, portable laboratories and equipment for itinerant schools, charts, slides, maps, films, stands, cases, and other equipment for exhibits to be made throughout the state, lantern and miscellaneous items. Estimated cost $5,400.

Supplies.

An appropriation will be required to provide the necessary office supplies to carry forward the work. This item should cover postage, stationery and other minor office supplies; provide a sum for the cost of telephone and telegraph service; provide supplies which are perishable for the exhibits to be sent out to the various fairs and other meetings; and for seeds for distribution among the farmers, trees for the various demonstration orchards; and should provide a sufficient amount to equip the demonstration trains which will be run through the state during this period. It is estimated that the above supplies will cost, approximately $6,300 per year.

The appropriation should provide for the publication of bulletins, which represent a very effective method of disseminating information, these bulletins to be simple, clear, practical. An appropriation for this purpose should be at least $5,000 per year.

There should also be provision made for traveling expenses of the field workers. This would amount to approximately $6,000 a year if the railway companies continue to support the work by issuing free transportation. If, for any reason, the railroad companies were unable to continue this assistance it would require approximately $11,000 per year.

Other Extension Workers.

The extension service of the College should be organized in such manner as to place the administration and direction of the work in a separate and distinct organization which will be in a position to work out the peculiar problems of extension service. Supervision of the subject matter of instruction should be vested absolutely in the various departments of the college. This arrangement will guarantee economy, efficiency and systematic service without danger of conflicting instruction between college, station and extension workers.

County Agricultural Advisors.

There is a wide spread demand in the state for the establishment of a system of county agricultural advisors. Such a plan seems logical and has been successful in other states. It is recommended in this connection that the Legislature be petitioned to pass a law authorizing the counties to appropriate from their general funds, or by special levy, a certain amount of money. The bill should provide further that upon this money becoming available there should be appropriated from the general funds of the state a certain amount to be added to that appropriated by the county and such total amount to be used to pay the salary and expenses of the local advisor for that county or group of counties. In some of the larger counties this amount will probably have to be larger, but in other counties there may be a compact between from two to four counties by which they will divide the expenses and services of such an advisor. The law should also particularly provide that the Agricultural College should have general supervision over the county advisors. This last is urged in order that harmony and unity of effort, so essential to successful work, shall be guaranteed.

Extension and the High Schools.

There is every reason to believe that courses in agriculture will continue to be rapidly installed in the high schools of the state and that county agricultural high schools and schools giving particular attention to agriculture and domestic science and the manual arts will be established. The work at these institutions will be in part extension work. For this reason the extension service, both that of the college direct and of the local advisors, should be closely allied with the work of these schools. They can be, in many instances, the demonstration centers of the communities.

Establishment of Demonstration Farms.

During the past year two demonstration farms have been established. The branch experiment stations are also doing more or less extension work. The work so carried on has not been placed directly under the jurisdiction of the Extension Division but it is urged that this be done as soon as practicable.

It is recommended that demonstration farms requiring expensive equipment, buildings, etc., be not established at this time. In place of this it is urged that plats of land be leased for demonstration purposes and for the raising of seed to be distributed in the various communities. With these demonstration plats as a center of community work, effective demonstration work can be done in cooperation with the farmers.

College Extension and Secondary Education.

Another important field which it seems necessary for the Extension Division to occupy at this time is in connection with the industrial work in the secondary schools in the state. During the past year the Division has cooperated with State Superintendent in a state wide movement to interest the school children in producing more and better agricultural products and to take a greater and more intelligent interest in the home and its related activities, and to a certain extent in the development of the mechanical arts. The work of the past year has resulted in laying a solid foundation of interest throughout the state which the writer believes is unprecedented. This has been done principally through the organization of county and district school fairs.

The growing need in connection with the work at this time is definite instruction both to the teachers and children in the subjects indicated above. We found, during the past year, that there is one teacher in a hundred in our rural schools competent to teach agriculture or to give the students real instruction and assistance in their attempt to produce the best products. In the majority of instances, also, this instruction cannot be secured from the parents.

If this whole work is not to collapse in disastrous reaction, the college must furnish, through the Extension Division, the necessary instruction. In order to do this the Extension workers must reach teachers' institutes; they must assist the county superintendents, and county supervisors; they must prepare bulletins in such simple and clear form as to be of service to the teachers and the children, and they must prepare correspondence courses in elementary agriculture and domestic science and art.

The Demand for Extension Work.

The people of the state of Oregon are now making tremendous demands upon the Agricultural College for extension service. These demands take the following form:

(1) For speakers and demonstrators at farmers' institutes in every county in the state, (2) For itinerant schools to go into the various communities and remain for a week or ten days giving instruction in the various agricultural subjects domestic science and art, etc., (3) For demonstration trains to cover the state in campaigns for the advancement of some specific phase of agricultureal work. (4) For lectures and demonstrations before commercial organizations throughout the state. (5) For lectures and demonstrations before such organizations at the Y. M. C. A. and the libraries, (6) For lecturers to take part in regular teachers' institues . (7) For lecturers before women's clubs, etc. (8) For correnspondence courses (a) in elementary agriculture primarily for teachers, (b) in domestic science and art, (c) in all the various subjects of agriculture for the practicing farmer, (d) in business methods for the farm and those engaged in similar business enterprises, (e) in the different subjects of engineering, (f) forestry, (g) pharmacy, (9) for aid in organizing (a) boys and girls clubs, (b) teachers' associations, (c) parents' associations, (d) rural community improvement associations, (e) debating associations in rural districts, (f) the promotion of rural life conferences which bring together those persons primarily interested in the improvement of rural conditions and harmonize their efforts. (10) For the publication of bulletins in simple clear style on all phases of agriculture, domestic science and art, engineering, and other related subjects. (11) For exhibits to be sent to the various county fairs, association meetings, grange meetings, farmers' union meetings, land shows, etc. (12) For demonstration farms; that is, farms and orchards located in various sections of the state which can be used to demonstrate to the people of each community the best methods of farming.

During the year requests for this kind of service have been as great as to overburden the institution. This has been true, despite the fact that it has been the policy of the Extension Division to discourage these requests until it should be in a position to meet them.

Appeals come to the Extension Division from persons of every class and in every conceivable situation . Many of these come from the older settlers who are awakening to the advantages of the new methods; many from people who are going from the city to the farm, and who are absolutely ignorant of the best methods; persons who come to Oregon from every section of the world and who are ignorant of Oregon conditions; from young people in the rural districts who are anxious to make more of their lives than have their parents; and from a multitude of individuals whose wants cannot be placed in any particular classification.

What Other States Are Doing.

The people of the United States have recognized in this new educational campaign a service which is of peculiar value to them. Never has an educational movement met with such popular favor. Such insistent demands have been made upon the various state institutions as to force them to comply as rapidly as conditions would permit. Wisconsin, Minnesota, Kansas, Illinois, North Dakota, Ohio, Oklahoma, New York, Massachusetts, and many of the southern states have established a splendid extension service which is supported with appropriations amounting to from $10,000 to $160,000 annually .And in all of these states the demands are still growing so rapidly that it is impossible even to estimate the ultimate extent of this type of service that will be required.

Oregon Conditions.

If this service has proved of value to the older and more thickly settled states of the Union, it will be of much greater value to a state which is as new and which presents as many problems as does the state of Oregon. Here we have peculiar climatic conditions, a great difference of elevation, many different kinds of soil, varying amounts of rainfall, and with all of this the state is being rapidly settled with newcomers who are unfamiliar with Oregon conditions. All of this in addition to the thousands of problems relating to better roads, better homes, better schools, better churches, better methods of distribution of products, more intelligent treatment of our forests and natural resources, the development of our water powers, our mining resources, more intelligent and more profitable business methods on the farm, in the shops and in the home: more beautiful environment and a multitude of other problems which will constantly demand more and more help from the experts who are taking leadership in the great work.

The value of extension service can only be fully appreciated by those who are in a position to know both the great amount of valuable information now in the possession of the experts who have made a study of these various subjects, and the conditions in the state which could be im proved if this information were properly disseminated. I do not hesitate to say that for every dollar that is expended in extension service a thousand dollars will be returned to the state.

Respectfully submitted,
RALPH D. HETZEL,
Director Extension Division.

REPORT OF THE LIBRARIAN.

To the President of the College:

Sir: In response to your request of October 8, 1912, I have the honor to submit the following report of the library for the past two years; together with estimates for the library budget for the coming biennium, July 1, 1913 to July 1, 1915:

Size of Library.

The library at present consists of 22,000 volumes including government documents, together with about 35,000 pamphlets. The library subscribes for 268 periodicals, and receives about 150 gratis, the latter being chiefly farm journals and country newspapers. The library has received as a gift 49 volumes. These gifts were chiefly from members of the college faculty, the College Folk Club, and a Japanese student, Mr. S. Nishizaki.

During the past biennium the library received an appropriation of $15,000 for books and periodicals. It is due to this much needed apropriation that the library has been able to make a growth commensurate to the growing needs of the college. From the crop pest appropriation, books and periodicals to the amount of over $2,000 have been added to the research material of the library, which was before lamentably inadequate to the needs of the research department.

Library Staff.

The library staff consists of the librarian and four assistants with a page working three hours a day.

Service.

The regular service of the library consists in the circulation of books and in reference work for students and faculty. The library is open from 8:00 A. M. to 6:00 P. M. with a closed hour for lunch, and open four evenings in the week from 7:00 to 9:00 P. M.

Besides the regular service the librarian conducts classes, teaching all freshmen during their first semester how to use the library; at present there are 465 students receiving such instruction in classes reciting one hour a week. During the winter short course session the librarian gives lectures on library material helpful to farmers and how it may be secured. There has been of late an increasing call throughout the state for reference material from the college library, especially on agricultural subjects.

LIBRARY REQUIREMENTS FOR THE BIENNIUM, JULY 1, 1913 TO JULY 1, 1915

Equipment.

24,00 blank catalog cards	$ 72.00
20,000 Library of Congress catalog cards	200.00
10,000 order cards	20.00
4,000 binding slips	4.00
500 periodical record cards	2.50
2 18-tray catalog cases	150.00
1 18-tray shelf list case	80.00
1 letter filing cabinet	50.00
Periodical binders	25.00
300 pamphlet boxes	35.00
300 pamphlet covers	30.00
600 book supports	45.00
100 Shelf label holders	7.50
Miscellaneous equipment	100.00
	$821.00

Supplies.

Postage	$ 200.00
Stationery and printing	100.00
Postals (overdue notices) (4,000)	50.00
Book repair material	20.00
Miscellaneous (including ink, pencils, book varnish, typewriter ribbons, etc.)	50.00
Total	$420.00

Requirements for the next two years.

General library.

Books	$4,000.00
Binding	2,000.00
Rebinding worn books	100.00
Back sets of periodicals, transactions of societies, out of print reports and bulletins	1,400.00
Periodicals currently taken by general library	500.00
Total	$8,000.00

Departments.

Books and periodicals $600 per year	$12,000

Room.

When the library was organized July 1 to October 1, 1908, there were in the library 4,264 books cataloged, 1000 (estimated) uncataloged, 5,000 government documents (bound) including duplicates, and 10,000 pamphlets (estimated.) At this date, November 1, 1912, there are 12,519 books cataloged, 2,000 books uncataloged and about 1,000 books ordered, 6,952 goverment documents (bound) and 35,000 pamphlets. In this time we have added to our library quarters only two small class rooms; this addition exhausts our possibilities of expansion in this building. Thus it will be seen that while our library has grown into three times its original size in number of volumes, our shelving capacity has increased less than one-third.

Our student body in 1908-09 numbered 1,351, in 1911-12, 2,868; thus while our student body and consequently our number of readers has more than doubled, we have not been able to increase our reading room space at all. The result is that there are times when students wishing to use the library cannot be seated, but are obliged to stand, crowded about the room.

The efficiency and economy of service are greatly impaired from the crowded condition of the library, which makes it impossible to keep the material to be used shelved in its logical order.

It is also impossible for us to complete files of valuable government and state reports essential to our work, because we have no room in which to place them. This entails a permanent loss to the library because each year it grows more difficult to secure these back reports.

From every point of view of storage and service it will be seen that a new building in which to house the library is an imperative need.

Statement giving totals.

Salaries	$10,894.40
Equipment (other than books and periodicals)	821,00
Supplies	420.00
Books, periodicals and binding (general library)	8,000.00
Books and periodicals (departments)	12,000.00
Total	$32,135.40

Respectfully submitted,

IDA A. KIDDER,

Librarian.

REPORT OF THE SUPERINTENDENT OF HEATING

To the President of the College:

Sir: In accordance with your request I beg to submit the following report for **Heating.**

The Mines building and Armory have Webster Vacuum heating systems installed and were recently connected to the Old and New Heating Plants respectively.

I would suggest that new buildings for the future be equipped with vacuum heating systems, Webster or Van Auken preferred, and that all buildings that are now heated by gravity steam systems be changed to the vacuum system. As this would be a considerable expense, perhaps several thousand dollars, this might partially be brought about by changing the steam heat as the buildings are remodelled.

The Science building needs the heating system repaired as the building has settled and the water hammer in the pipes is a cause of continual annoyance. The estimated cost of this repair is $750.00, and even then the heating of this building would be far from ideal. I believe the best arrangement for this building, since the pipes under the floors are badly corroded, due to the acids used in this building, is to install an up-to-date vacuum system, which would cost approximately $3,500.00.

The Vacuum systems are rated on the basis of 100 sq. ft. of radiating surface to the boiler horse power and the gravity systems are rated 85 sq. ft. to the boiler horse power, a difference of 15 per cent.

The Steam Mains in the basements of the Agronomy and the Agricultural buildings should be covered as soon as funds are available for this work.

New Heating Plant.

This plant was installed in 1910; the equipment of the boiler room consisted of one 250 H. P. water tube boiler, two feed pumps, two vacuum pumps and sump pump.

A reinforced concrete tunnel four by five-and-one-half feet, runs from the boiler house a distance of 1,070 feet to a point west of the Agricultural Hall. Through this tunnel the high pressure steam mains and return pipes pass.

Conduits branch from the tunnel to the Agricultural, Agronomy, Science, and Waldo Hall buildings. The high pressure steam is reduced to the proper pressure for heating in the basements of these buildings. The amount of radiating surface in the above buildings was 18,600 sq. ft.

In 1911 the Gymnasium, with 2400 sq. ft. of radiation surface was added to this plant making the total 2100 sq. ft at that time. In January, 1912, a 155 H. P. boiler was added to the plant which gives a total of 405 H.P. in the two boilers. The Horticulture and Dairy buildings were connected to the heating plant at that time. The Armory was connected in September. The aggregate is 29,000 sq. ft of radiating surface, not counting the steam mains and return.

Cord wood was used for fuel when the plant was first put in operation, but owing to the scarcity of this fuel it was necessary to use green slab, which was very unsatisfactory, and after careful investigation it was decided to install fuel oil apparatus, and use oil for fuel. A contract was made for oil for thirty-six months from Oct. 31, 1911. Fuel oil has been very satisfactory as we are able to furnish the steam wanted while with green wood this at times would be impossible.

During the past school year, 5,916.15 barrels of oil were used, at a cost of $6,513.70 and $7,500.00 would be a fair estimate for this year

It will be impossible to add any more radiation to this plant until the boiler capacity is increased, which will mean not only additional boiler, but boiler room, chimney, larger pipe mains and fuel apparatus.

I would suggest that additional boiler space be so arranged that boilers may be placed in single setting of 250 to 300 H. P. each, instead of battery setting as we now have.

In estimating for new buildings the following may be used: Tunnels complete with pipes $13.50 per ft. Conduits complete $4.50 per ft. Fuel for additional radiation at 25 cents per sq. ft. per school year.

Boilers set up complete ready to fire may be estimated at $21.00 per H. P. A reinforced concrete chimney to take care of approximately three times the radiation now used would cost $5,000.00

Improvements-New Heating Plant-if more radiation is to be added:

Additional boiler (30 H. P.)	$ 6,300.00
Boiler room	5,000.00
Chimney (reinforced concrete)	5,000.00
Larger pipe mains	4,000.00
Fuel apparatus	700 00
Total	$21,000.00

Following are the improvements to the plant required regardless of any added radiation:

Drainage for tunnel, conduit, and oil tanks and connecting same to the sewer at Washington St., $1050.00.

Valves and traps in main steam line just above the Waldo Hall branch, to save heating long pipe line when only Waldo Hall is to be heated, $185.00.

The Farm Mechanics, Stock Judging buildings and the Bandstand should be connected to the heating system when the plant is enlarged.

Approximate cost, Farm Mech. & Stock Judging	$4,000.00
Approximate cost Bandstand	985.00

Total Improvements.

Plant (for additional radiation)	$21,000.00
Immediate (drainage to sewer and valves in steam main)	1,235.00
Connections (Farm Mech. & Bandstand)	4,985.00

Repair to New Plant.

Taking two per cent, which is considered a fair estimate for repairs and upkeep, would give $875.00 per year.

Old Heating Plant.

To change this plant to fuel oil would cost approximately $3000.00. I doubt that this is advisable under the present conditions, as this plant cannot be used much longer. Have added vacuum pump to this plant for the heating of the Mines building.

Repairs to Plant. In case of a break in the steam mains to the buildings $525.00 would probably be needed, but for general repair $150.00 per year will keep this plant running.

Repairs to Cauthorn Hall Plant.

$75.00 per year should be ample to keep this plant in repair.

ESTIMATED COST PER ANNUM OF HEATING BUILDINGS.

New Heating Plant	1913-1914	1914-1915
Fuel	$ 8,250.00	$ 9,250.00
Labor	1,800.00	1,900.00
Old Heating Plant		
Fuel	2,850.00	2,850.00
Labor	720.00	720.00
Fuel Miscellaneous.		
Waldo Hall	250.00	250.00
Green Houses	300.00	300.00
Shepard Hall	375.00	375.00
Total	$14,545.00	$15,645.00
Total for Biennium		$30,190.00

IMPROVEMENTS

New Heating Plant	$ 1,235.00
Science Bldg. Vacuum Heating System	3,500.00
Farm Mechanics connected to Heating	4,000.00
Bandstand	985.00
New Plant for additional radiation	21,000.00
Total Improvements	$30,720.00

REPAIRS

	1913-1914	1914-1915
New Heating Plant	$ 875.00	875.00
Old Heating Plant	675.00	675.00
Cauthorn Hall	75.00	75.00
	$1,605.00	$1,605.00

TOTAL

Heating per Annum	1913-1914	1914-1915
Fuel and Labor	$14,545.00	$15,645.00
Repairs	1,605.00	1,605.00
	$16,155.00	$17,255.00
Improvements		$30,720.00

Respectfully submitted,
M. C. PHILLIPS,
Superintendent of Heating.

REPORT OF THE DIRECTOR OF THE EXPERIMENT STATION

To the President of the College:

Sir: I beg to submit herewith a synoptical report of the Experiment Station for the year ending June 30 1912. The work of the Station Staff for the past year has been exceedingly satisfactory, both from a practical and a scientific viewpoint.

I call your attention, at the outset, to the fact that publications, in the form of reports from the several sub-stations, and the Crop Pest Report, will soon be available, giving more complete information of the activities of the Experiment Station and its branches.

DEPARTMENT OF ENTOMOLOGY

Adams Investigations.

As heretofore the work has consisted entirely in continued research investigations on the lime-sulfur spray. During the year this work has consisted largely in a careful study of what has come to be known as lime-sulful injury and in preparing for publication the results of the lime-sulfur investigations to date. It has been thought best to transfer any further work in the lime-sulfur spray to the Crop Pest division, hence the adoption of two other Adams research problems has been recommended, namely, the study of the insects of the Douglas fir and the study of the red spiders .

During the year considerable time has been devoted to getting the results of the lime-sulfur investigations in condition for publication, and the manuscript is practically ready for submission.

Hatch Investigations.

Investigations under this fund include a study of apple aphis, forest insects, clover seed insects and an investigation of insect pests of strawberies.

Crop Pest Investigations.

Owing to the purpose for which the appropriation was made much more latitude has been exercised in the nature of the work undertaken. This work has consisted not only of detailed investigations of a number of pests, but has also included the correspondence of the department, such extension work as has been done, care of the collection, and the preparation of an illustrated report on the principal insect pests of the state which will be ready for publication this fall; in addition a number of short ciruclars have been prepared.

In a general way the Crop Pest work is divided into two sub-divisions; namely investigation of orchard insects and investigation of insects which infest small fruit, vegetables, and ornamentals. During the past year the principal orchard insects which have been under investigation are: Shot-hole borer, codling moth, and brown apple aphis. The principal insect pests of small fruits and vegetables which have been under investigation are: strawberry root weevil, strawberry-root borer, and currant maggot. More or less detailed investigations have been made upon many other insect-pests, both of the orchard and garden.

DEPARTMENT OF HORTICULTURE

Adams Investigations.

Project No. I—Pollenation.

Satisfactory progress has been made in this investigation during the past year and much material has been collected for future study.

The pollenation in the field for the determination of mutual affinities was this year conducted on a somewhat limited scale. It seems that this phase of the work is about completed and future endeavors will be directed toward verification of past results. The work so far has more or less definitely shown that it increases (1) the percentage of set; (2) the uniformity of the fruit, and (3) the size, considerably, by the use of a congenial pollenizer over one which is not congenial, greatly, by the use of a pollenizer over none at all. In self sterile varieties these influences are distinctly marked, as well as favorably influencing the setting of fruit. This work has also definitely shown that color is not influenced by pollenation, but by orchard practices, such as cultivation, pruning, fertilization, etc. It has also shown that the banding and striping of fruit is not due to pollenation, but to bud variation.

In field studies of pollenation the influence of frost in fruit setting is especially noticeable with pears. Thus it would be interesting to know if it is possible for fruit to be fertilized after it has been subjected to a light frost.

It has also been noticed that many fruits recorded as self sterile, or but partially self-sterile will set quite abundantly when pollenated by their own pollen if aphis are present in the clusters.

The work in pollenation also includes a study of fruit bud formation and initial development of the young fruit from an histological rather than morphological viewpoint. This study includes a large amount of microscopic work, representing 1500 slides. The work also includes a study of the vascular system of young fruit. It is thought that much of the failure in fruit setting is due to some defect in this system.

Project No. 2—Irrigation

This was conducted along the same general lines as last year, except more thoroughly, thus giving more conclusive results. Bulletin No. 113, "Orchard Irrigation Studies in the Rouge River Valley" contains the results of the past five years' work. The Department of Chemistry is cooperating in this work, making chemical studies of fruit grown upon the various experimental plots. Between four and five hundred slides have been prepared for tissue studies in this work.

The laboratory work in this investigation has been considerably broadened, especially as related to the study of the buds and woods of irrigated trees, noting the differences in rapidity of bud development and the effect of varying amounts of water upon the ratio of flower and fruit buds.

Hatch Investigations.

Strawberry Variety Tests.

This investigation includes not only a study of the behavior of several hundred varieties of strawberries grown at this station, but through correspondence and observation, a study of their behavior in many parts of the state.

Strawberry Breeding Investigations.

In 1910 a strawberry breeding investigation was undertaken at this station. Crosses between a number of the leading commercial varieties and several wild species have been made. Over eight hundred plants of known parentage have been fruited and the characteristics of each individual plant have been studied in careful detail.

Loganberry Fertilizers Investigation

This investigation includes the testing of various fertilizers upon different plots. The work has been continued since 1906 and it will require at least two more seasons before definite deductions can be made.

Orchard Cover Crop Investigations.

This work was started in 1908 but was interrupted because of certain accidents to the orchard in which the investigations were made. Work is underway for the continuation of this investigation on a new tract of land where conditions will be more completely under control.

Nut Variety Investigations

The station has a large planting of nut trees, containing some of the most promising varieties of walnuts, filberts, chestnuts, and pecans for Oregon conditions. Al ready filberts are fruiting and notes are kept of the behavior of all varieties of nuts grown.

Pruning Investigations

This will include an investigation in the pruning of the Loganberry and apple tree. Three hundred and twenty-three apple trees of four leading varieties have been planted for this work.

Cherry, Prune and Apple Breeding Investigations.

The object of this work in the cherry is to produce a cherry of the Royal Anne type but maturing two or three weeks later; in the prune, to produce a prune of the Fellenburg type, but maturing ten days to two weeks earlier, to escape the early fall rains; and in the apple, to learn what breeding material, now available for work, may be expected to do when used for breeding work, or in other words, to find out how the laws of heredity will operate in the eight hundred seedlings grown from seed secured in the pollenation work and grafted on Doucin roots this season.

Vegetable Growing Investigations

This includes field and green-house work. Tomatoes were grown to compare relative efficiency and commercial value of certain green-house varieties, their characteristics, such as yield, size, color and shape, and other similarly essentials, to get fancy market varieties.

2. To compare methods of pollenation as affecting general efficiency of product. For this work the following varieties are being grown: Lorillard, Comet, Jewel, Earliana, Sterling, Castle, and Bonny Best.

Pollenation methods have been employed to secure a maximum production of fruit by a thorough setting of blossoms particularly those of the first three or four clusters. The methods of pollenation have been divided into three classes, to determine the relative efficiency and value of each: (1) by hand pollenation; (2) by jarring; (3) plants not hand pollenated or jarred.

Greenhouse experiments have also been conducted in the growing of cucumbers, cantaloupes, peppers, and lettuce.

The outdoor experimental work consisted mainly in the growing of winter cauliflowers and tomatoes.

Crop Pest Work.

Frost Investigations

During the past spring, work was conducted at Riddle in a thirty acre prune orchard, but weather conditions were such that only a very light frost was experienced.

Tests were made with the various grades of oil; crude oils, Richmond oils, and oils which contained impurities, especially water. A test was also conducted for the burning time with the measured gallon of oil. It was found that one form of pot, not previously used in Oregon, exceeded all others in length of burning time. An experiment was run to determine the temperature secured when burning a measured gallon of oil. Fifty heaters and seven different makes of pots were used, the length of time varying from two hours and one minute to three hours and four minutes, the highest increase secured being three degrees, and the lowest one and one-fourth degrees, showing considerable difference according to the type of pot used.

An experiment was conducted to determine the burning time of the heaters when filled to their capacity. A study was made of temperatures, to determine the temperature which injures the fruit; of the frost alarms, and in addition a daily weather record was kept in cooperation with the U. S. Weather Bureau in this work.

Investigations were also conducted in Winter Injury, fruit spots, and the prune industry. The work with prunes includes a survey, which has been completed; fertilizing experiments, some of which are cooperative with growers in the prune-growing districts of Newberg, and it is also contemplated to undertake this season some investigations in the evaporation of prunes.

An extensive study has also been made of the variety adaptability of fruit to different sections of the state. A study of horticultural by-products has also been made. This presents an important field for investigation.

DEPARTMENT OF AGRONOMY

Hatch Investigations.

The soiling rotations have been continued with the addition of several new soiling crops and the fertility rotations are now being laid out permanently. At the home station the past year three hundred permanent one-tenth acre plots have been surveyed and staked, and most of these will be devoted to the fertility rotation, fertilizer tests, and soiling crop rotations and the remainder to experiments in plant breeding for crop improvement of legumes and grains.

The chief work in plant improvement during the year has been a very much enlarged variety trial of oats and barley, a new trial of varieties of flax and a very much increased variety trial of potatoes, together with the continuance of the corn variety tests. A number of selections of potatoes, barley, oats, weat and corn have been planted in head row tests so that there is now an excellent start in the plant improvement work.

The experiment, with the propagation and liming of alfalfa have been continued, and in addition this year interesting trials of different crops planted on ground which has been for ten years or more in alfalfa have been undertaken. The kale breeding work has been continued as heretofore with the same excellent results.

The work in irrigation of Western Oregon crops has been continued on a slightly enlarged basis, but on practically the same plan as originally laid out and reported last year with the same general results.

DEPARTMENT OF BOTANY AND PLANT PATHOLOGY

Adams Investigations.

Cherry Gummosis.

This work has been carried on for a number of years, and as a result a strain of bacterium has been discovered at this Station in blighted cherry spurs which when used in artificial inoculation, showed that this organism caused gumming on trunk and branches wherever inoculated, as well as on spurs. From diseased trees in the vicinity of Corvallis and Salem bacteria were isolated not only from spurs but also from cankers on trunk and limbs.

Diseased trees have been studied microscopically and so far as can be judged from examinations up to date the disease starts through some spur which becomes infected, or through some rough or injured place in the bark. It appears to spread upward and downward from the starting point in the region just inside the green tissue under the outer bark, and seems to spread more slowly in the lateral direction, working gradually in toward the wood. Its progress is shown by a brown discoloration of the normally white tisue and often there are large brown streaks extending above and below cankered and gumming spots. The outer layers of the bark are killed rapidly and stop growing. On this account the bark sometimes tends to split during the growth and expansion of healthy surrounding tissue. When the disease, working inward, strikes the cambium, the production of gum is noticed, of which there is little or no indication where the disease is confined to the cortex. Gum formation seems to follow abnormal or pathological cambial activity. The disease may eventually kill large areas of cambium and in such cases the gum is found to be produced along the margins of the canker where there are still living cells. Bacteria are associated so constantly with the disease and often in such peculiar isolated spots that it is difficult to think that they do not have a special role in the disease, even if they be not the primary cause.

Experiment, inquiry, and observation substantiate the general recommendations previously made in regard to controlling the disease. Gutting out should be practiced on trees already affected. This should be very thorough and all browned tissues lying under the outer bark should be removed down to the wood, or down to healthy tissue. Discolored streaks and patches lying above and below gumming cankers should be washed with a solution of corrosive sublimate (1 to 1000). Gumming is not always an early symptom of the disease. Search should be made for unhealthy looking spots on trunks and limbs and dead spurs should be cut off and the cut surface sterilized. The inspection and care of trees for this evil should be as thorough as for fire blight.

In setting out new orchards, by far the most successful method yet discovered for coping with gummosis is the planting of Mazzard seedlings, which are to a large extent immune to disease. These should be allowed to branch and the desired marketable variety should be budded onto these branches from six to twelve inches away from the trunk. The trunk, crotch and limb bases, usually the seat of the most destructive form of the disease, will be clean where this method is followed and only the tops need be watched for incipient stages which can be quickly cut out.

Apple Tree Anthracnose

The work under this project has continued along the same lines as heretofore; namely investigation of the life history of the fungus and method of control. The ascosporic stage of the fungus causing anthracnose has been discovered. The disease has been found as a parasite upon the quince, an hitherto unreported host. Spraying experiments have been carried on now for two years in the Wallace Orchard at Salem, which had been very seriously affected. After spraying for two years, the disease is almost completely eradicated and positive recommendations can be made, not only to hold the disease in check in slightly affected orchards, but to clean a badly diseased orchard.

Hatch Investigations.

The Hatch fund has been used largely to supplement the work carried out under the Crop Pest Fund reported below. Two important investigations, however, have been made under this fund upon certain root rots of strawberries and important alfalfa diseases. Cultures have been made of the organisms causing these diseases and greenhouse work is planned for the coming winter.

An important quince disease, new to the state and probably new to science, has been discovered; namely, a rust which in one orchard has caused a loss of at least fifty per cent of the crop. It is probable that this rust is connected with another form growing upon native cedar trees, **Librocedrus decurrens.** Culture work to prove the connecnection of the two hosts is planned for the following spring. Similar diseases were also found on the pear and possibly on the apple; these we hope to work out the same time.

Crop Pest Investigations.

Potato Diseases

A study of potato diseases in Oregon has been undertaken. The main work up to the present time has been largely survey work in order to find out the distribution and extent of the diseases in the state, and it has been found that there are at least six well defined potato diseases, some of them causing great losses. It is planned to study each of these in detail, with special reference to Oregon conditions. Co-operative work with the Department of Agriculture is also under way in testing various varieties of potatoes for disease resistance, the seed having been furnished by the Department of Agriculture. A small field has been planted on the College farm where both good and bad potatoes have been used.

Apple Fruit Spots

Preliminary work has also been started upon apple fruit spots. Various forms have been studied and an attempt made to classify them. A co-operative experiment with the Department of Horticulture has already been started in an effort to control bitter pit of the apple, a physiological disease.

Winter Injury

A study of winter injury has been undertaken. An experiment in shading prune trees has been conducted in the vicinity of Salem. Recent observations tend to show that the so-called winter injury of the prune may prove to be a disease somewhat similar to the gummosis of the cherry and of pathogenic origin.

Bark Canker of Apple and Pear

An efort has been made to classify the various fungi causing bark canker of apples and pears. Various fungi have been isolated and inoculations made.

DEPARTMENT OF BACTERIOLOGY

Adams Investigations.

Activities of Oregon Soil Bacteria

Work in the study of activities of Oregon soil bacteria has been undertaken this year. In this work the department inaugurated a line of experiments and research dealing with the more particular non-symbyotic bacteria found in the soil It is hoped that this work may be pushed much farther during the next year, the present work being merely preliminary. The department has examined soils from the college farm and from the Union and Hermiston substations. The work deals more particularly with the following tions. The work deals more particularly with the following: Ammonification, denitrification, nitrification, nitrogen-fixation, and cellulose digestion.

Hatch Investigations.

Seed and Soil Inoculation

One of the principal lines of activity of the laboratory has been the furnishing of cultures for seed and soil inoculation to the farmers of the state. The department has furnished cultures to approximately three hundred different farmers, and for a number of different leguminous crops, although the principal ones, as is to be expected, have been alfalfa, vetch and clover. The returns which are coming in show a great degree of satisfaction on the part of the farmers with the benefits derived from inoculation, averaging from five to one hundred per cent. The large percentage of favorable replies is particularly satisfactory in view of the fact that the soils of the Willamette Valley are acid and in need of lime, and therefore soil inoculation might not to be expected to be as satisfactory as in the more arid districts where the soil is more nearly neutral.

The department has examined a good many commercial cultures on the market used for soil inoculation during the past year, both by culture methods and by crop tests. These results are on file and are for the use of any who care to apply for them. They show that many of the commercial cultures are utterly valueless. During the past year the department has isolated an entirely new series of soil inoculation legumes from the various leguminous crops grown in the state, the idea being that bacteria isolated from local crops will be better suited for Oregon conditions of inoculation. It is this series which has been sent out to the farmers during the past season.

Yeasts

Considerable work has been done with yeasts during the past year. The department has obtained selected strains of yeast from various authorities in the country who have isolated and perfected these strains for rapid and complete fermentation power in the making of ciders and vinegars. It is hoped next year to be able to furnish farmers and manufacturers of the state with selected strains of micro-organisms for this industry, which should be an important one in the state.

In dairy bacteriology the department has done a certain amount of work with milk forms and has isolated a number of the more common forms found in milk, using them for artificial starters, studying both the rapidity of acid formation and the completeness of the activity. It is found to be perfectly feasible to select these bacteria and furnish them also to the manufacturers and farmers of the state for the manufacture of high grade butter.

State Funds.

A very large amount of material is received by the department during the year for routine examination and it is found that one of the department's most important functions in the state is the examination of such material, thus aiding to better the health and sanitary conditions, both of man and live stock in the state. The department has done a good deal of water examination and pathological work during the past year. The pathological material reaching the laboratory included more particularly hog cholera and chicken diseases. Chicken tuberculosis is shown to be very common in the state, and its prevalence warrants a campaign of publicity in order to hold it in check.

DEPARTMENT OF DAIRY HUSBANDRY

Hatch Investigations.

Kale Feeding

A feeding trial was conducted to determine what quantity of kale might safely be used in the daily ration of dairy cows and also whether kale might be used to replace a portion of the concentrates in the winter ration. Six cows were divided into two groups of three cows each. The average milk production, as well as the stage of lactation, of the two groups was nearly equal at the beginning of the experiment.

Group II was fed the basal ration which consisted of 15 lbs. vetch hay, 7 lbs. bran and shorts, equal parts by weight, and 30 lbs. of kale. Group I was fed the experimental ration which varied from the basal ration by increasing the kale 1 lb. per day for 45 days, and for 10 lbs. increase digestible dry matter in the two rations at about the same amount. When the daily feed of kale reached 75 lbs. per cow it was found that the animals would not eat this amount if it were equally divided between the two feeds, so 50 lbs. were fed at night and 25 lbs. in the morning, and thus they were induced to eat 75 lbs. daily. The amount, however, appeared about the limit of consumption. The animals receiving the heavy kale ration were all Jerseys of an average live weight of about 900 lbs. The full ration of 75 lbs. of kale daily was fed for seven days.

The records show that the cows receiving the heavy kale ration did not hold up in their milk flow as well as those receiving less kale and more grain, as indicated below :

Milk	Group I 75 lbs. kale	Group II 30 lbs. kale.
Total milk produced 1st week	559.	564.
Total milk produced 11th week.	414.	477.

Shrinkage in 11 weeks	145.	87.
Average weekly shrinkage	13.2	7.9
Fat :		
Total fat produced 1st week	30.87	24.2
Total fat produced 11th week	23.07	19.0
Shrinkage in 11 weeks	7.80	5.02
Average weekly shrinkage	.71	.45

In the matter of body weight the three cows in Group I decreased an aggregate of 36 lbs. in the 11 weeks, while the three cows in Group II increased an aggregate of 87 lbs.

The milk produced by each group was kept separate and tested by tasting for the presence of kale flavor. Comparisons were begun when the cows in Group I were getting 50 lbs. kale daily and continued through the period of heaviest kale feeding. Three hundred ninety comparisons were made by people in boarding houses, short course students, special dairy students, and men in the department. Of all these examinations, 122 preferred the milk produced by Group I, 118 that produced by Group II, while 150 showed no preference.

These results indicate that kale may be fed in large quantities without material injury to the flavor of both milk and butter if fed properly. In this work the kale was delivered at the dairy barn on alternate days, the supply being kept in the barn with the cows but about 20 feet distant. It was fed immediately after milking and no waste portion allowed to remain in the mangers. It appears that with reasonable care in feeding, large quantities of kale may be used per cow without injuriously affecting the flavor of milk or butter. If not correctly fed, however, a very decided kale flavor may be imparted to milk, cream, and butter.

The results of this experimental feeding indicate (1) that large quantities of kale may be fed to dairy cows without injury to the quality of milk; (2) heavy kale feeding with proportional reduction of concentrates does not properly maintain the milk flow; (3) heavy kale feeding appears to have an unfavorable effect on the bodily welfare of the animals, shown by decrease in live weight, and also by a less thrifty appearance of the animals as indicated by coat and general apperance.

Relative Importance of Dairy Products.

Some investigations have been carried on regarding the value of dairy products (milk, cream, butter and cheese) in the food materials entering into the cost of living. The comparatively few determinations made have shown a range from 16 to 32 per cent. In families where there are a number of children, the consumption of dairy products ranged higher than where the family is made up wholly of adults. In some of the boarding halls fully 25 per cent. of the cost of food material was expended for dairy products. It would seem to be a conservative estimate to state that in general 25 per cent of the cost of the materials which enter into our food preparations is expended for products of the dairy.

State Fund.

Miscellaneous Investigations.

This work includes herd testing for farmers and for the advanced register of Holsteins and Jerseys.

Work contemplated for the present year will include further investigations in kale feeding, a study of wide and narrow rations, partial versus complete soiling, and dairy manufacturing problems.

DEPARTMENT OF CHEMISTRY

Adams Investigations.

Hop Work

(1) The study of the effect of kiln-drying at the temperature of 145 degrees Fahr. has been continued and completed. The results show that there is little or no change in the composition of hops when dried at this temperature. Evidently the criticism made by European experts that the temperature (145 degrees) used by Oregon hop growers for drying their hops is too high, is unwarranted.

(2) The comparative study of the commercial and scientific methods of hop valuation has also been continued and completed. The commercial methods have been found to be inaccurate. Before hops can be judged on their active intrinsic value different methods must be adopted to take the place of those now in use.

(3) A new method for the determination of tannen in the hop has been worked out. The methods which have been in use for the determination of this constituent have been shown to be grossly inaccurate. The results obtained by this method are 20 per cent. to 30 per cent. lower than those obtained by the methods now in use.

(4) A comparative study of the composition of hops grown in England, New York, Wisconsin, Washington, California and Oregon has been made. This work involved the complete analysis of about forty different samples. The bitter resin content of English hops has been found to

be much lower than American hops. The bitter resin content is greater in Pacific Coast hops than in New York's or Wisconsin's.

Chemical Spray Investigations

(1) The exact chemical reaction which takes place when sulfur reacts with calcium hydroxide in aqueous solution has been determined. In carrying out this work the secondary reactions which take place following the primary reaction have also been determined.

(2) From the data obtained a theoretical basis for determining the proportions of lime and sulfur which should be used in the manufacture of lime sulfur spray has been established.

(3) The composition of self-boiled lime-sulfur spray has been studied. The chief constituents of this material are calcium hydroxide and free sulfur; the amount of soluble sulfur compounds formed in preparing this spray is very small.

(4) Some work has been done on the lead arsenate and zinc arsenate but thus far the work has been tentative and at this time no definite results can be given.

(5) The amount of soluble arsenic formed when soap is mixed with arsenate of lead for spraying has been given some attention. The results are hardly complete as yet but indicate that when soap is mixed with the acid arsenate of lead a considerable amount of arsenic goes into the solution while with the neutral arsenate little or no arsenic is rendered soluble.

A Study of Variation in Composition of Fruits Under Irrigation.

Complete analysis of thirty-five samples of apples were made this last season in connection with the irrigation experiments of the department of horticulture. In carrying out this work about 430 analytical determinations were made. The principal results obtained from the chemical study of the ripening of the apples may be summarized as follows:

(1) The percentage of moisture is greater and total solids less in the irrigated apples.

(2) During the ripening period there is a gradual decrease in the percentage of total solids in the unirrigated apples while there is a gradual increase in the irrigated apples.

(3) The percentage of cane sugar is as a rule greater in the irrigated, while the reducing sugar and total sugar are greater in the unirrigated apples.

(4) The changes in the composition of the different

samples during the storage period were markedly parallel, the samples grown with irrigation not differing to any extent from the samples grown without irrigation.

Incubation Experiments.

A study of the composition of incubator hatched chicks and hen hatched chicks has been carried on in cooperation with the department of poultry husbandry.

Hatch Fund.

Soil Investigations

Investigation on ammonification and nitrogen fixation in Oregon soils have been carried on in cooperation with the department of bacteriology.

Study in Composition of Forage Crops and Grains

An investigation is being made of the composition of the various forage crops and grains of the state.

Soil Analysis

During the past year twenty complete soil analyses have been made. The examination of these samples was made in a much more thorough manner than those which have been made heretofore in this department. In each instance composite samples were taken of the surface soil and the subsoil.

State Funds.

Fertilizer Control Work

Fifty samples of fertilizers including samples and mixed materials have been collected on the market and have been analyzed.

Miscellaneous Work

Under this head are classified various determinations which have been made for residents of the state. The materials examined consist in the main of feeding stuffs, mineral waters, insecticides, and fungicides. Several of the feeding stuffs contained large percentages of crude fibre, indicating a high content of hulls.

POULTRY HUSBANDRY DEPARTMENT

Adams Fund.

Incubation Investigations

An effort is being made to determine the cause of the great losses in the hatching and raising of chickens by artificial methods. This involves the study of the fundamental differences in conditions of natural and artificial incubation and brooding. The principal problems involved are

(1) the effect of moisture or different degrees of humidity on the hatching of the egg, and the vitality of the chick; (2) the effect of varying amounts of ventilation in the incubator; (3) the effect of different cooling temperatures; (4) the effect of frequent turning of the eggs; (5) the effect of these various factors on: (a) the moisture content of the chick; (b) the lime content; (c) the nitrogen content of the chick; (6) the function of hen-oil on egg shell and of carbon dioxide in hatching.

Hatch Fund.

Poultry Breeding

The object of this work is to determine if possible whether heavy egg production is inherited and if so to breed up a flock of heavy producers to furnish the farmers of the state with stock for improving egg laying qualities of the fowls. The plan of work is as follows: (1) To select, with the aid of the trap nest, the best layers from established breeds. The department is using Plymouth Rocks and Leghorns. At the same time some of the poorest layers are selected and bred from as a check on the others. (2) By crossing these breeds to determine the effect of crossing on both the vigor and productiveness of the fowls; (3) To establish a new variety with high egg production as its chief characteristic, but which shall be a breed that will better meet the market demands for a medium sized fowl than either the Plymouth Rock or Leghorn, and which shall, at the same time, be a breed that will produce white eggs. In other words to produce a general purpose utility fowl for farmers. The records for the past three years indicate that the laying qualities, by careful individual selection, may be improved in any of the breeds.

DEPARTMENT OF ANIMAL HUSBANDRY

The major work of this department during the past year was the growing and fattening of swine. A carload each of cattle and lambs, however, were experimentally fed during the year.

There were six hog-feeding experiments conducted during the year as follows: (1) Skim milk versus second growth vetch pasture as supplemental for grain in pig feeding; (2) an investigation in the cost of producing swine; (3) ground wheat and shorts versus ground wheat and skim milk; (4) hand feeding versus self feeder, and ground wheat versus ground wheat 92 per cent., tankage 8 per cent.; (5) yard versus pen feeding; (6) an investigation to determine the birth cost of pigs.

Summary Results.

Experiemnt (1). Twelve Yorkshire shoats were included in this experiment, divided into two lots. Lot 1 received skim milk, shorts and barley. Consumed for 100 lbs. gain: shorts 37 lbs., barley 34 lbs., skim milk 657 lbs. Estimating the grain at $1.40 per cwt. and skim milk at 25c per cwt., the cost of production was $6.42 per cwt. Lot 2: In addition to the vetch pasture it required for 100 lbs gain: shorts 464 lbs., barley 50 lbs., at $1.40 per cwt. Cost of production $7.19. Lot 2 at the conclusion of the field test was not finished, hence the pigs were placed in the pen and fed shorts and skim milk from which they made a remarkable gain. Food consumed for 100 lbs. gain; 276 lbs. shorts, 490 lbs. skim milk Cost per 100 lbs. gain, $5.08.

Experiment (2). Sow No. 1 farrowed 9 pigs December 28, 1910 Sow No. 2 farrowed 6 pigs Jan. 27, 1911. Three pigs died before weaning, 1 weighing 43 lbs. 1 19 lbs., and 1 9 lbs., making a total loss of 71 lbs. In the estimates given below the 71 lbs. are not included as a part of the cost of growing. Total gain 1275 lbs.; grain consumed, 3731 lbs.; milk consumed for 100 lbs. gain, 416 lbs. Grain consumed for 100 lbs. gain 292 lbs. Cost per 100 lbs. growth, $5.07.

Experiment (3). In this experiment 3 shotes were fattened. Lots 1 and 2, 8 pigs in each lot, consisted of high class pigs, cross breeds between Yorkshire sows and Berkshire sire; lots 3 and 4 with 7 pigs in each lot, were classed as scrubs. Total gain in 60 days, Lot 1, 600 lbs.; lot 2, 816 lbs.; lot 3, 249 lbs.; lot 4, 662 lbs. Total feed consumed; Lot 1, 870.6 lbs. shorts, 1738 lbs. ground wheat; lot 2, 2013.4 lbs. ground wheat, 3591. lbs. skim milk; lot 3, 548.12 lbs. shorts and 849.5 lbs. ground wheat; lot 4, 1659.65 lbs. ground wheat, 2614 lbs. skim milk.

Lots 3 and 4 lacked uniformity, and the very poor showing in Lot 3 was largely due to the fact that several of the pigs developed rheumatism which seriously interfered with their growth. Lot 4 despite the poor breeding, made a very satisfactory gain.

Experiment (4). 24 shotes were included in this experiment. They were divided into four lots of six each. Lot 1 was fed ground wheat and tankage by hand; Lot 2, ground wheat by hand; Lot 3, ground wheat and tankage in self feeder: Lot 4, ground wheat in self feeder. Feed required for 100 lbs. gain; Lot 1, 510 lbs., lot 2, 670 lbs. lot 3, 506 lbs., lot 4, 569 lbs.

While the gains in this experiment were not satisfactory, it demonstrated that the self feeder in this instance gave as good results as hand feeding.

In comparing the wheat and tankage with the wheat alone the difference is apparent. It was found on the average that 1 lb. of tankage saved 3 3-4 lbs. of wheat.

Experiment (5). Lots 1 and 2 comprised 8 Duroc shotes and 1 Berkshire shote, purchased from a local farmer. These pigs had evidently been stunted and were small for the age. Lot 1 consisted of 4 Durocs and 1 Berkshire and were kept in a comfortable pen. Lot 2, consisted of 4 Durocs. They were kept in an open, muddy yard and a comfortable colony house for sleeping quarters. They were fed ground wheat and tankage, 92 per cent. of the former and 8 per cent, of the latter. Total gains for a feeding period of 62 days, lot 1, 448 lbs., lot 2, 352 lbs. Feed per 100 lbs. gain, lot 1, 333 lbs.; lot 2, 339 lbs.; cost per 100 lbs. gain $5.00 for lot 1, $5.09 for lot 2.

Experiment (6) Two Yorkshire sows were selected for this experiment. They consumed during the four months preceding furrowing 587 lbs. of ground barley, 1300 lbs. skim milk and ¼ acre of rape pasture. The two sows gave birth to 23 pigs, 19 of which reached maturity. The birth cost of each, based upon the commercial value of the feed consumed by the sows was about 70c. This however, included feed only and does not take into consideration interest, labor, housing, service of sire etc.

Cattle Feeding Experiments.

For this work twenty good, dehorned, range steers were purchased at the Portland Stock Yards for $5.25 per cwt. Total weight at time of purchase, 21,160 lbs. They were divided into three lots. Lots 1 and 3 contained 7 each and lot 2, 6. These steers were confined continuously in large comfortable box stalls during the fattening period. They did not, however, take kindly to their environment and seemed restless and and discontented. They were also more or less constantly disturbed by visitors. These seem to be the contributing factors in the very poor feeding results obtained.

Lots 1 and 3 were fed alfalfa hay; lot 1 was fed a small supplemental feed of rolled barley in addition to the alfalfa hay. Following is a summary of the results for the 92 day fattening period:

	Lot 1	Lot 2	Lot 3
Daily gain per steer	1.241 lbs.	1.04 lbs.	1.18 lbs
Alfalfa consumed per head daily	24.2 lbs.	24.2 lbs.	26.9 lbs.

Grain consumed per head daily	3.42 lbs.		
Hay consumed per 1 lb. gain	19.3 lbs.	23.1 lbs.	22.7 lbs.
Grain consumed per 1 lb. gain	2.75 lbs.		
Hay saved by 1 lb. grain	1.31 lbs.		

While the selling price of these steers was the same it was very evident Lot 1 was the best finished of the three lots.

Lamb Feeding Experiments.

The purpose of this experiment was to determine the difference, if any, in fattening lambs under shelter and in the open. A flock of 104 range lambs was purchased at the Portland Stock Yards. These were divided into two lots of 52 each. Lot 1 was confined in a light, airy, comfortable pen in the barn and lot 2 was fed in an open but well drained paddock. Following is a summary:

	Lot 1	Lot 2
Average weight per head, November 25, 1911	61.6 lb.	61.7 lb.
Average weight per head, March 5, 1912	79.9 lb.	76.9 lb.
Average gain per head	17.9 lb.	15.2 lb.
Total grain consumed (wheat and oats)	4385.0 "	4222.0 lb.
Total hay consumed (vetch and oats)	11930.0 "	11826.0 "
Total hay wasted	2299.0 lb.	unknown
Grain consumed daily per head	0.772 lb.	0.775 lb.
Hay consumed daily per head	2.15 lb.	2.11 lb.
Daily gain per head (101 days)	.177	.151 lb.
Hay consumed for 100 lbs. gain	13.87 lb.	18.6 lb.
Grain consumed for 100 lbs. gain	4.73 lb.	6.63 lb.

The waste hay in lot 1 was fed to other stock, thus reducing the loss to a negligible quantity, while the waste hay in Lot 2 was a total loss as to feed value. The lambs in Lot 1 at all times appeared much more contented than those in Lot 2.

These lambs were sold on the Portland market and Lot 1 sold for $6.13 per cwt., Lot 2 for $4.65. Lot 2 sold for really less than their value. This was evidently due to the muddy, bedraggled appearance of the lambs.

PUBLICATIONS

The following publications have been issued by the experiment station during the year:

Bulletin 110—Preliminary Frost Fighting Studies in the Rogue River Valley
Bulletin 111—Orchard Management,

Bulletin 112—The Soils of Oregon,
Bulletin 113—Orchard Irrigation Studies in the Rogue River Valley.
Circular 14—Insecticides for the Gardener
Circular 15—Two Apple Tree Borers
Ciruclar 16—A Method of Budding the Walnut
Circular 17—Apple Tree Anthracnose
Circular 18—The Hog & Field Pea Special
Circular 19—Oregon Station Trap Nest.
Circular 20—The Pollenation Question

EASTERN OREGON EXPERIMENT STATION.

Work at this station has been continued along the same general lines as reported in 1911 The hog feeding experiments, however, having been considerably greater and excellent results have been secured. This work has included the economical growing of swine as well as finishing for the market.

A number of lots have been seeded to alfalfa and in addition to the alfalfa pasture various supplemental grain feeding experiments have been conducted. The field pea is proving to be a very desirable hog feed, both as grain and for the system known as "hogging-off." So far experiments show that the Grande Ronde Valley is admirably adapted to the production of swine.

Excellent results have also been secured from the breeding of new cereals. A number of the hybred barleys are proving to be heavy yielders of high quality grain and promise to be of exceptional value to the agriculture of that section. A very promising hybred wheat has been produced from a cross between the Little Club and Fortyfold. This seems to possess characteristics that should make it valuable for Eastern Oregon conditions. This wheat has a compact, large head, good straw, yeilds heavily and has the appearance of possessing good milling qualities.

A number of variety tests with cereals and other field and garden crops have been made; cultured methods studied, and weed extermination by means of mechanical devices and chemical sprays. Investigations in trees and small fruits have been made and cooperative spraying with growers undertaken.

EXPERIMENTAL DRY FARM AT MORO

The work of this substation during the past year has been very satisfactory. This work has been largely along the same general lines as heretofore reported, except a much larger acreage has been devoted to the growing of alfalfa and field peas, both of which are proving excellent for the dry farming sections. The work of the station is showing excellent results and is proving a valuable object lesson to the farmers of this section.

UMATILLA EXPERIMENT STATION

Excellent progress is being made at this farm, especially the work of soil building by means of compost and green manuring. Some damage was experienced the past spring from an unusual wind, but the crops which escaped injury have done remarkably well. It is found that by increasing the organic matter in this soil the duty of water is lowered and soil fertility greatly increased.

HARNEY COUNTY DRY-LAND STATION.

The buildings at this station are completed, comprising superintendent's residence, the foreman's cottage; barn, containing seed room; machine shed, containing the shop; and a combined wood and pump house. The two hundred acres of land have all been cleared of sage brush, plowed and fenced, and during the present year have been summer fallowed in preparation for crops the ensuing year.

With the Harney station at Burns as the center of the work, some six or eight demonstration fields have been established, covering all the different conditions in the county. These fields are about ten acres in size, fenced, and are handled cooperatively as demonstrations by good farmers in the different sections.

SOUTHERN OREGON STATION

This station is now thoroughly established at Tangent, and much work is under way. Considerable cooperative work with growers has been done during the past season This work consisted mainly of experiments in winter pruning, summer pruning, fertilizing and cover crops.

At this station experimental testing of fruits will be undertaken to ascertain adaptability to climate, soil, resistance to disease, keeping qualities and shipping qualities, flavor, etc.

Extensive experimental growing of vegetables will be undertaken to determine best varieties, season of planting, methods of irrigation and use of fertilizers.

DEMONSTRATION FARMS

Under the supervision of the department of agronomy, two demonstration farms in Crook County have been maintained during this season—one for dry-farming, at Metolius, and one for irrigation-farming at Redmond. Both of these farms have been very successfully operated and have proven valuable as object lessons to the farmers of their respective localities.

NEEDS OF THE EXPERIMENT STATION

Funds for Publications.

In the various departments of the station much unpublinshed experimental data have accumulated. This data, if published in a proper form, would be of immense value to the farmers of the state. The experiment station is overwhelmed with demands for information, one department having sent out over seven thousand letters, during the past year, in answer to correspondents. A great amount of time is thus consumed by correspondence when much of the information could better be supplied to the applicant in published form. There i sa constant growing demand upon the station for information covering a very wide range of agricultural subjects. This phase of station work is becoming so serious a problem that it is imperative that some relief be given.

In view of these facts, I would respectfully recommend that an effort be made to secure an annual appropriation of $5,000 for the publication of the experimental data of the station.

Stock Feeding Experiments.

It is estimated that the farm live stock of Oregon represents a total value of $82,645.942, thus indicating that the live stock industry is assuming very large proportions. With the exception of data secured from hog feeding experiments upon a restricted scale, there is practically no reliable information in this state as to the cost and best methods for fattening stock. It would seem, therefore, that the time is opportune for this station to secure, at the earliest possible moment, reliable data regarding this important industry.

Eastern Oregon is the great meat producing section of the state; hence it would be desirable to conduct experiments in live stock feeding under conditions prevailing there. I would therefore, earnestly recommend, first, that preparations be made to take up this work at the Eastern Oregon experiment station in cooperation with this station at the earliest practical date, and second, that the three hundred acres of land not at present utilized for experimental work be devoted to the growing of forage crops for the special purpose of fattening stock.

Poultry Breeding Farm.

The initial work of the experiment station poultry department in breeding egg laying strains of poultry has proved conclusively that this characteristic is hereditary. Experiments conducted by the department have also shown that there is a very wide range in egg production among hens of the same breed. For example, in a pen of Plymouth Rocks, receiving identiclly the same care and feed, the range of production was from twelve to two hundred fifty-nine eggs in one year. It would seem, therefore, that if a breeding plant could be established for supplying to farmers, on a large scale, cockrels bred from heavy laying strains, it would be of tremendous financial interest to the state. The poultry industry is rapidly becoming very important, and if the average egg production per hen can be materially increased, it would mean, of course, much greater financial returns.

In the breeding work for an egg production, two methods are followed: first, by the selection of breeding stock from existing breeds and varieties; second, by crossings to establish a new breed or variety that will excel in laying and general utility qualities. It is thought from the progress already made, that within a few years the latter result may be obtained.

For this work, it is estimated that fifty to seventy-five acres of land will be required and that when the farm is properly stocked and equiped with buildings and fences, it will be self sustaining.

Estimated cost of plant: land, $7,000.00; residence. $2.000.00; barn. $500.00; poultry houses. $1.000.00; fencing. $500.00; eam, $400.00; implements, $400.00; incidental supplies, $200.00; total, $12,000.00.

Respectfully submitted,

JAMES WITHYCOMBE.

Director.

REPORT OF THE DEPARTMENT OF LIGHT AND POWER.

To the President of the College:

Sir: I submit herewith estimates and recommendations for the Department of Light and Power for the Biennium ending June 30, 1915:

Electricity for light and power	$7,000
Mechanician's salary, two years	1,000
Replacement of pole near gymnasium	20
Lamps	900
Curve drawing Volmeters and Wattmeter	325
Miscellaneous supplies, wire, porcelain, sockets, fuse plugs, lamp cord, carbons, arc light globes, gasolene, solder, tape	450
10 K. W. Transformer	100
Tools	15
	$9,810

The suppies and lamps listed are for current maintenance, replacement, and new work that arises during the year but which cannot be foreseen.

Estimates for repair and rewiring of existing buildings are submitted as a part of Mr. Jackson's report. The largest single piece of work contemplated is the rewiring of Science Hall as a part of the comprehensive scheme of improvement. The wiring of the Administration building is in a very unsatisfactory condition, but so far as can be determined from that which is visible, is probably safe.

A mechanical assistant is absolutely necessary to improve a service thoroughly unsatisfactory and inefficient. Two hundred and twenty-five dollars have been appropriated to handle regular maintenance work, and at the rate orders have been received as much additional labor will be expended this year on special requisitions as is asked for the hire of a permanent and competent assistant, who alone could attend to most, if not all, of this work. At present the department employs four students, who work as schedule permits, and are rarely on hand when there is an emergency call.

Physics and Electrical Engineering in their estimates call for half of the time of this assistant.

The distributing system of the college is at present in fairly good shape. After another two years of service, however, the poles from the Agricultural Building to Cauthorn Avenue should be replaced.

Curve drawing instruments should be provided, in order to ascertain whether or not the Oregon Power Company is keeping within its guarantee of voltage regulation. It is also necessary to have daily records of power consumption in case an estimate should ever be called for with a view to establishing a College Power Plant. Voltage curves are necessary, also, in order to determine the proper lamps to purchase.

A 10 K. W. transformer is asked for, simply as reserve apparatus to be used in case of failure of any existing equipment.

Respectfully submitted,

W. A. HILLEBRAND,

Superintendent of Light and Power.

REPORT OF THE REGISTRAR

To the President of the College:

Sir: I have the honor to submit herewith my report as Registrar of the College. The report covers the academic years 1910-11, 1911-12, and to December 21 of the year 1912-13.

TABLE NO. 1 Student enrollment by courses

COURSES	1910-11	1911-12	1912-13*
Agriculture.			
Regular 36-week courses........	237	303	407
Winter short courses.................	527	1432	
Forestry.			
Regular 36-week courses........	31	32	42
Winter short courses..............		6	
Domestic Science and Art.			
Regular 36-week courses........	147	213	256
Winter Short Courses..............	168	103	
Engineering..			
Civil Engineering			
Regular 36-week courses..........	76	71	66
Electrical Engineering			
Regular 36-week courses..........	71	68	83
Mining Engineering			
Regular 36-week courses..........	29	21	18
Mechanical Engineering			
Regular 36-week courses........	110	122	119
Winter short courses in Manual Training..................................	10	28	
Commerce.			
Regular 36-week courses........	123	145	128
Winter short courses................	11	14	
Pharmacy.			
Regular 36-week courses........	48	55	50
Optional.			
Regular 36-week term............	22	21	46
Music.			
Regular courses in music........	76	91	42
Summer School.			
Summer term of 6 weeks........	174	143	98
	1860	2868	1355
Less names counted twice........	82		
Total enrollment, excluding names counted twice................	1778	2868	1355

*The report for 1912-13 is complete only to December 21, 1912, and, therefore, does not include enrollment in winter short courses.

TABLE NO. 2. Comparative statement of registration classified as to sex. All duplicates excluded.

	1910-11			1911-12			1912-13*		
COURSES	Men	Women	Total	Men	Women	Total	Men	Women	Total
Regular courses, 36-week term........	705	265	970	766	376	1142	872	385	1257
Winter short courses	436	213	649	1010	573	1583			
Summer school	23	136	159	34	109	143	19	79	98
	1164	614	1778	1810	1058	2868	891	464	1355

Table No. 3. Per cent of students in the regular 36-week courses registered in

	1910-11	1911-12	1912-13
Secondary Courses	22.25	18.35	13.58
Degree Courses	77.75	81.83	86.42

Table No. 4. Showing the distribution of students by collegiate rank or year.

CLASSIFICATION	1910-11	1911-12	1912-13*
Graduates	15	18	25
Seniors	137	122	107**
Juniors	131	97**	176
Sophomores	133	178	206
Freshmen	222	367	435
Optionals	22	21	46
Specials	35	50	55
Secondary	199	198	165
Music	76	91	42
Winter Short Courses	649	1583	
Summer Session	159	143	98
Totals	1778	2868	1355

*The report for 1912-13 is complete only to December 21, 1912, and, therefore, does not include enrollment in winter short courses.

**The decrease in the number of juniors in 1911-12 and in the number of seniors in 1912-13-these students including only those who matriculated with advanced standing since the standard was raised in 1908.

TABLE NO. 7 A comparative statement of educational preparation of entrants before registering at the Oregon Agricultural College.

	1910-11		1911-12		1912-13	
Preparation of entrants	No of entrants	Percent of entrants	No. of entrants	Percent of entrants	No. of entrants	Percent of entrants
Entered on exam.	13	4.03	1	.21	3	.54
8th grade grads.	67	20.84	55	11.8	95	17.28
9th grade grads.	24	7.45	56	12.02	51	9.28
10th grade grads.	61	18.94	93	19.69	102	18.55
11th grade grads.	34	10.55	50	10.73	45	8.18
12th grade grads.	72	22.36	139	29.83	201	36.54
College transfers	51	15.83	72	15.45	53	9.63
Totals	322	100.00	466	100.00	550	100.00

The entering class of 1912-13, as complete to December 21, 1912, represents an increase over the year 1910-1911 of 71 per cent.

TABLE NO. 9.—Summary of statistics for the first semester of the years 1910-11, 1911-12, and 1912-13 (to December 21), showing (1) the number of students, (2) the hours of instruction per week, and (3) the percentage of increase of the first semester 1912-13 over the first semester 1910-11 or for the biennium.

DEPARTMENT.	1910-11		1911-12		1912-13		Increase for Biennium	
	Students	Inst. hours	Stud dents	Inst. hours	Students	Inst. hours	Students	Inst. hours
Agronomy	165	29	238	53	325	60	97.0	106.9
Animal Husbandry and Veterinary Science (2)	192	36	174	35	115	27	—40.1	—25.0
Dairy Husbandry (3)	72	23	98	27	40	26	—45.7	13.0
Bacteriology	93		110	23	180	52½	93.5	101.0
Botany and Plant Pathology	151	48	259	50	391	77	158.9	60.1
Horticulture	245	59	273	58	381	67	55.5	13.7
Poultry Husbandry	18	6	26	12	34	22	88.9	266.6
Zoology and Entomology	114	37	202	42	276	67	142.1	81.1
Civil Engineering (4)	142	45	132	23	123	67	—13.4	48.9
Electrical Engineering	92	24	72	38	74	27	—19.5	12.5
Mechanical Engineering	472	196	598	202	679	230	43.9	17.3
Mining Engineering	71	28	99	34	69	44	—2.8	57.1
Domestic Art	173	55	282	72	347	99	100.5	80.0
Domestic Science	200	47	246	56	305	63	52.5	34.0
Commerce (Pol. Science and Pol Economy included (5)	404	104	697	103	911	124	125.4	19.2
Pharmacy (6)	140	18	169	21	133	30	—5.0	66.7
Forestry	49	27	49	36	70	37	42.9	37.0
Chemistry	314	82	447	92	541	136	72.3	65.8
Physics	159	69	152	59	303	85	90.6	23.2
Mathematics	757	97	850	102½	749	98½	—1.0	1.5

English Language and Literature	765	101	964	92	1304	112	70.4	10.8
Public Speaking	273	27	268	23	288	22	5.5	—18.5
Modern Language	251	45	308	45	338	50	31.5	11.1
History	132	12	143	12	165	21	25.0	75.0
Art and Architecture	229	48	274	56	266	62	16.1	29.1
Industrial Pedagogy	68	10	83	14	88	18	29.4	80.0
Physical Education	536	20	657	26	1032	40	92.5	100.0
Library	210	4	329	6	420	8	100.0	100.0
Military Science	190	4	170	4	147	4	—22.6	.....
Military Drill	660	...	766	...	872	...	32.1	.....

(1)—Statistics complete only to December 21, 1912.

(2)—Two courses with 66 students and 5 teaching hours have been transferred from first to second semester for the year 1912-13, and two courses with 20 students and 4 teachings hours have been dropped and the work given in other departments, which accounts for the apparent decrease.

(3)—The sophomore courses in Dairy Husbandry have been transferred from the first to the second semester for the year 1912-13, which accounts for the apparent decrease. It is estimated that 127 students will be enrolled in the courses in dairying during the second semester of the present year.

(4)—One class in Railroad Surveying has been transferred from first to second semester, reducing the enrollment of the semester by 18 students.

(5)—In addition to the students in residence, the School of Commerce has been giving correspondence instruction in "Business Methods on the Farm" to upward of 50 students.

(6)—The decrease in the number of students enrolled in Pharmacy classes is due to the fact that the entering class of this year is composed of a greater percentage of degree course students. These enter the professional subjects in the junior year, whereas the two-year short course students enter these classes at the beginning of their first year. The departmental registration to date of the present year is greater than for either of the two preceding years.

Table No. 5. **Showing distribution of students by residence.**

	36-Week Courses			Short Courses**			Total all Courses		
	1910-11	1911-12	1912-13	1910-11	1911-12	1912-13	1910-11	1911-12	1912-13
Oregon	827	948	1006	748	1639	89	1575	2587	1095
Other States									
Alabama			1						1
Alaska	3	2	3	1			4	2	3
Arizona	1	1	1				1	1	1
California	25	43	65	6	6	1	31	49	66
Colorado	4	1	1		2		4	3	1
Connecticut		1	1	3			3	1	1
Delaware		1	3					1	3
Dist. of Columbia	1	1	1	1			2	1	1
Idaho	10	21	22	2	4		12	25	22
Illinois	7	6	4		2	2	7	8	6
Indiana	3	4	2		1		3	5	2
Iowa	1	1	3	1	1	1	2	2	4
Kansas	2	1	1	1			3	1	1
Kentucky		2	3					2	3
Louisiana	2		1				2		1
Maine		2						2	
Massachusetts		4	6		2			6	6
Michigan	2	2	2		1		2	3	2
Minnesota	2	7	3	3	3		5	10	3
Missouri		2	1	1	1		1	3	1
Montana	3	2	1	1	1		4	3	1
Nebraska	2	1	3	2	3		4	4	3
New Hampshire		1	1					1	1
New Jersey	1	1	2				1	1	2
New Mexico			1						1
New York	6	2	8	2	3		8	5	8
N. Carolina	1	1	1		2		1	3	1
N. Dakota	2		1	1			3		1
Ohio	2	2		1			--	3	2
Oklahoma	2	4	5				2	4	5
Pennsylvania	2	1	1		2		2	3	1
S. Dakota	2	1	2				2	1	2
Texas	1				1		1	1	
Utah		4	1					4	1
Vermont		1	1					1	1
Virginia					1			1	
Washington	37	49	65	28	33	3	65	82	68
West Virginia					1			1	
Wisconsin	5	1	1	1			6	1	1

Wyoming		2	1					2	1
	127	175	221	54	71	7	181	246	228

*The report for 1912-13 is complete only to December 21, 1912, and therefore, does not include enrollment in winter short courses. However, the summer school enrollment is included.

**Includes summer school enrollment.

TABLE NO. 6. Table showing average of students in the seconary and degree Courses.

	1910-11	1911-12	1912-13*
Secondary courses	18.	18.75	18.3
Degree courses	20.25	20.5	19.75

Table No. 8. Statement showing colleges, universities, normal schools, and academies from which students in the entering class transferred for the year of 1911-12, and to March 21, of the year 1912.

1911-12

OREGON INSTITUTIONS.

- Albany College
- Columbia College
- Mt. Angel College
- Oregon State Normal
- Pacific College
- Pacific University
- Philomath College
- Tualatin Academy
- University of Oregon

INSTITUTIONS IN OTHER STATES.

- Agricultural College of Utah
- Armour Institute of Technology (Chicago)
- Berea College (Kentucky)
- California Polytechnic Institute
- Columbia University (New York)
- Evanston Academy (Illinois)
- Grenville College (Illinois)
- Harvard Military Academy (California)
- Iowa State College
- Nebraska State Normal
- Normal Institute (North Carolina)
- Oklahoma Agricultural and

1912-13*

OREGON INSTITUTIONS.

- North Pacific College of Pharmacy
- Oregon State Normal
- Pacific College
- Reed College
- University of Oregon
- Willamette University

INSTITUTIONS IN OTHER STATES.

- Agricultural School of Kyoto (Japan)
- Agricultural College of South Dakota
- Alberta College (Canda)
- Columbia College (Canada)
- Columbia University (N. Y.)
- Cornell University (N. Y.)
- Highland Park College (Iowa)
- Hiram College (Iowa)
- Iowa State College
- Marionsville College
- National Council (India)
- Oberlin College (Ohio)
- Ohio Wesleyan

Mechanical College
South Dakota State Normal School
Troop Polytechnic School (California
University of California
University of Idaho
University of Illinois
University of Maine
University of Nebraska
University of Puget Sound (Wash.)
University of Wyoming
Washington State Normal
Westbrook Seminary (Maine)
Williams College (Mass)

Purdue University (Indiana)
Stanford University(California)
University of California
University of Mexico
University of Idaho
University of Minnesota
University of Puget Sound (Wash)
University of Toronto (Canada)
University of Washington
University of Wisconsin
Utah Agricultural College
Washington State College
Yale University (Conn.)

*Complete only to December 31, 1912

TABLE NO. 10. Graduates. Giving the classification of graduates by degrees and courses for the years ending June, 1911, and June 1912; also the names and addresses of members of the graduating classes.

	CLASS OF 1911	CLASS OF 1912
Bachelor of Science in		
Agriculture	23	27
Forestry	5	
Domestic Science and Art	14	33
Civil Engineering	18	11
Electrical Engineering	10	9
Mechanical Engineering	16	12
Mining Engineering	9	5
Commerce	21	8
Pharmacy	8	7
Totals	124	112
Master of Science in		
Agriculture	3	1
Pharmacy	1	
Electrical Engineer		1
Totals	128	114
Diplomas and Certificates		
Music	1	5
Pharmacy Short Course	6	7
Totals	135	126

GRADUATING CLASS OF 1911

Bachelor of Science in Agriculture.

James Quincy Adams, Sheboygan, Wisconsin
Albert Allan Asbahr, Cornelius, Washington County
James Linwood Batchelder, Hillsboro, Washington County
Leslie Beaty, Walkerton, Indiana
Pandurang Khankhoje, Wardha, India
Otto Herman Elmer, Mulino, Clackamas
Orlando B. Hardy, Portland, Multnomah
Willamette W. Harris, Oregon City, Clackamas
Bird Norman Hawley, Star, Lane
Philo Benjamin Hawley, Cottage Grove, Lane
Godfrey Vernon Copson, Deadwood, South Dakota
Albert Fred John Lafky, Salem, Marion
Harry Arthur Lindgren, Melrose, Douglas
Raymond Stewart Loosely, Ft. Klamath, Klamath
Forrest William McGinnis, Corvallis, Benton
George Rieben, Banks, Washington
John Wyatt Surry, Lyons, Linn
Charles Claude Thompson, Hood River, Hood River
Fred Venard Tooley, Portland, Multnomah
Nathan Daniel Vail, Stillwater, Oklahoma
Harold Edward Wahlberg, Lents, Multnomah
Raymond Ustick Williams, Denver, Colorado
Dorris Shelby Young, Sherwood, Clackamas

Bachelor of Science in Forestry.

Harold Harrison Barbur, Portland, Multnomah
Howard James Eberly, North Yakima, Washington
Adolph Nilsson, Portland, Multnomah
William Fritz Raithel, Santa Barba, California
Benjamin Blaine Totten, Corvallis Benton

Bachelor of Science in Domestic Science and Art.

Edith Stanley Brogden, Hillsboro, Washington
Belle Bertie Edwards, Monroe, Benton
Vera Etta Haskell, Port Orchard, Washington
Zoa Irwin, Corvallis
Ielleen Allanna Leech, Grants Pass, Josephine
Leonora Makelim, Portland, Multnomah
Ruby Irene Olsen, Corvallis, Benton
Carrie Maude Pimm, Philomath, Benton
Minnie Price, Kings Valley, Benton
Helen Raber, Corvallis, Benton
Alice Gertrude Shepard, Roosevelt, Washington
Rae Snow, Boise, Idaho
Ruby Irene Starr, Corvallis, Benton

Ruth McNary Smith, Marshfield, Coos
Mabel Gertrude Williamson, Wells, Benton

Bachelor of Science in Civil Engineering.

Merlin Taylor Calef, Portland, Multnomah
William Robert Carlson, Milwaukie, Clackamas
William Connel Dyer, Salem, Marion
Herbert James Gilkey, Grants Pass, Josephine
George Lyle Harper, Grants Pass, Josephine
Alfin Johnson, Seaside, Clatsop
Walter McHewell Keck, Hammond, Clatsop
Joseph Linzy McAllister, Yamhill, Yamhill
Henry Clay Montgomery, Bridal Veil, Multnomah
Arthur O'Conner, Montague, California
Phillip Ray Poff, St. Johns, Multnomah
Leroy Comstock Rulifson, Salem, Marion
Alvin Lester Raines, Lacomb, Linn
Lawrence George Russell, Corvallis, Benton
Charles Ernest Stricklin, Olex,Gilliam
Laurence Edgar Swan, LaCrosse Wisconsin
Earl Withycombe, Corvallis, Benton

Bachelor of Science in Electrical Engineering.

Roy Borden, Newport, Lincoln
Harry Palmer Cady, Corvallis, Benton
John Darwin Carnegie, Albany, Linn
Jackson Kenlm Fairchild, Portland, Multnomah
Charles Agustus French, Corvallis, Benton
Albert Porter Gibson, Ontario, Malheur
Lee Marion Harris, Vale, Malheur
Leroy Vernon Hicks, Ashland, Jackson
Bernhard Olsen, Milwaukie, Clackamas
Henry John Pfandhoe, Falls City, Polk

Bachelor of Science in Mechanical engineering.

Charles Eric Armstrong, Corvallis, Benton
Earl Chase Brooks, Tucson, Arizona
Fred Edgar Ewart, Portland, Multnomah
James William Graham, Gardner, Douglas
Frederick Benhart Gross, Athena, Umatilla
Anders Marinus Jeppsen, Bacona, Washington Co.
Charles McFerrin Hartsook, Albany, Linn
William Dexter Haskell, Port Orchard, Washington St.
William Melville Herren, Portland, Multnomah
Charles Leroy Nelson, Scappoose, Columbia
Lawrence William Park, Corvallis, Benton
Holly Henry Siemens, Klamath Falls, Klamath
Roy Herbert Sprague, Corvallis, Benton

William Everett, Taylor, Oregon City, Clackamas
Carl Wolff, Portland, Multnomah
Joseph Benjamin Yoder, Hubbard, Marion

Bachelor of Science in Mining Engineering.

Edward James Atckinson, Portland, Multnomah
Clifford Aaron Dunn, Cloverdale, Tillamook
John Oscar Enberg, Baker, Baker
Vincent Paul Gianella, Honcut, California
Chester Carl Howe, Hillyard, Washington St.
Clarence Lloyd Jamison, Iditarod, Alaska
Lawrence Carter Keene, Salem, Marion
Horace Fichard Landfare, Portland, Multnomah
Neil Lukens Simons, Portland, Multnomah

Bachelor of Science in Commerce.

Challis William Allen, Lostine, Wallowa
Jennie Margarette Bossen, Langlois, Curry
Rolstyn Daniel Bridges, Cordova, Alaska
George Elmer Chapman, Fossil, Wheeler
Clarence Hervert Eagy, Albany, Linn
Viola Gardner, Corvallis, Benton
Homer Harry Hayes, Joseph, Wallowa
Claude Elgin Howard, Bridal Veil, Multnomah
Alva Walter Jones, Heppner, Morrow
Glenn Curtis Jones, Heppner, Morrow
Angie Charlotte Kyle, Monroe, Benton
Edward Rudolph Leibner, Albany, Linn
Erwin Bertran Lemon, Grass Valley, Sherman
Fern Gladys Loughridge, Hendrick, Iowa
Iva Belle McGinnis, Corvallis, Benton
Emmett B. Moore, Corvallic, Benton
Gertrude Frances Nolan, Corvallis, Benton
Earl Arney Olsen, Warrington Clatsop
Mrs. Littie Birdie Riggs, Vancouver, Washington St.
Maurice Edgar Smead, Heppner, Morrow
Ora Weaver, Myrtle Creek, Douglas

Bachelor of Science in Pharmacy.

Vernon Jordan Brown. Corvallis, Benton
Isaac Ray Chapman, Fossil, Wheeler
Bess Carmen Garrett, Ashland Jackson
Roy Fred Ginther, Corvallis, Benton
Zon Velma Miller, Amity, Yamhill
Ira Edward Newsom, Portland, Multnomah
Ruth Winnifred Scovill, Grants Pass, Josephine
William Jeptha Thornton, Roseburg, Douglas

Master of Science in Agriculture.

Annie Laura Hill-Griffin, Corvallis, Benton
Frederick Llewellyn Griffin, Corvallis, Benton
Helen Margaret Gilkey, Corvallis, Benton

Master of Science in Pharmacy.

Edward Cleveland Callaway, Spokane, Washington

Diploma School of Music.

Queen Inez Johnson, Corvallis, Benton

GRADUATING CLASS OF 1912

Agriculture.

Samuel Hubbell Arbuthnot, Corvallis, Benton
Sidney Harold Boddinghouse, Willamette, Illinois
Frank Henry Boulan, Portland, Multnomah
Gordon George Brown, Corvallis, Benton
Grover Carroll, Portland, Multnomah
Frank William Cline, Los Angeles, California
Robert Arnold Cook, Redmond, Crook
Harold Karl Dean, Baker, Baker
Vane Garfield Gibson, Jemestown, Indiana
Jay P. Green, Twin Falls, Idaho
John Delbert Griffin, Astoria, Clatsop
Charles Clarence Heid, Portland, Multnomah
Benjamin Ward Hollis, Corvallis, Benton
McKinley Huntington, Yoncalla, Douglas
Moichiro Kawashima, Tokyo, Japan
Morris Koon, Junction City,Lane
Mark Gustav Lafky, Salem, Marion
Jay Clark Leedy, Sherwood, Washington
Alfred Gunn Lunn, Camden, New Jersey
Knight Pearcy, Portland, Multnomah
Hiram Eldridge Pratt, Boston, Massachusetts
Clark Edwards Schultz, Corvallis, Benton
Charles E. Sitton, Carlton, Yamhill
Otto D. Sitton. Carlton, Yamhill
Alfred Edmund Volck, Junction City, Lane
Gustav Peter Wanstrom, Mist, Columbia
Maynard Andrew Young, Collins, Multnomah

Domestic Science and Art.

Isabella Vivien Ackerman, Monmouth, Polk.
Rae Margaret Atherton, Corvallis, Benton
Nora Emma Beebe, Central Point, Jackson
Sadie Bonner, Corvallis, Benton
Ruth Lillyn Corbett, Corvallis, Benton
Keren Lee Davis, Corvallis, Benton

Lila Grace Dobell, Corvallis, Benton
Caryl Edwards, Corvallis, Benton
Hortense Eppley, Salem, Marion
Laura Mabel Gardner, Corvallis, Benton
Charlotte Bodwell Hpff, Portland, Multnomah
Charlotte Bodwell Huff, Portland. Multnomah
Jane Agnes Johnston, Corvallis, Benton
Leonora Kerr, Corvallis, Benton
Minerva Kiger, Corvallis, Benton
Lizzie Koeber, Sherwood, Washington
Carrie Alice Leedy, Sherwood, Washington
Margaret McCall, Albany, Linn.
Willard Mitchell, Corvallis, Benton
Barbara Moore, Corvallis, Benton
Christie Moore, Corvallis, Benton ?
Claire Rudio Pierce, Hotlake, Union
Alice Petra Pimm, Philomath, Benton
Olivia Charlotte Pohland, Ashland, Jackson
Ruby Ailene Rice, Corvallis, Benton
Rose Mae Sheridan, Tangent, Linn
Florence La Rue Starbird, Portland, Multnomah
Nell Sykes, Salem, Marion
Genevieve Tillery, Corvallis, Benton
Jennie Olympia Totten,Corvallis, Benton
Clara Ellice Wallan, Hermiston, Umatilla
Vera Marie Wilder, Lyle Minnesota
Mary Aletha Wilson, Gresham, Multnomah

Civil Engineering.

Fred Grant Brown, Crystal, Klamath
John Townsend Burch,Rickreall, Polk
Joe Chernis, Portland, Multnomah
Elmer Ellsworth Hoshorn, Jr., Portland, Multnomah
Kenneth Burton Grimm, Hubbard, Marion
Carl V. Hersey, Portland, Multnomah
Charles Kennedy Hubbard, Dundee, Yamhill
Claude Alvin Mattson, Astoria, Clatsop
Marion Arthur Nickerson, Marcola, Lane
Loy Monroe Turner, Heppner, Morrow
Paul Raleigh Watson, Battle Ground, Washington State

Electrical Engineering.

John Harrison Belknap, Corvallis, Benton
Walter Wilber DuMoulin, Corvallis, Benton
Walter Loraine Haller, Corvallis, Benton
Anders Marinus Jeppesen, Bacona, Washington State
Howard Elmer McLean, Wallowa, Wallowa

Fred Orville McMillan, Salem, Marion
Ivar Emanuel Nelson, Ione, Morrow
Hugh Isaac Smith, Marshfield, Coos
William Roy Varner, Enterprise, Wallowa

Mechanical Engineering.

William Anthony Armstrong, Corvallis, Benton
Wilbur De Witt Andrews, Oregon City, Clacakmas
Allan Burdick, Portland, Multnomah
Earl William Heckart, Corvallis, Benton
William Henry McDaniel, Portland, Multnomah
James B. Mann, Portland, Multnomah
Fred A. Miller, Portland, Multnomah
Oliver Park Seim, Astoria, Clatsop
Odith K. Spurrier, Guthrie, Oklahoma
Charles Robertson Thomson, Portland, Multnomah
Otto Voss, Astoria Clatsop
Basil Witzig, Corvallis, Benton

Mining Engineering.

Albert Frederick Eschricht, Portland, Multnomah
Clyde Claton Levan, Portland, Multnomah
Cecil Elma Metcalf, Portland, Multnomah
Glenn Stuart Paxson, Newberg, Yamhill
Ernest Graham Rice, Portland, Multnomah

Commerce.

Chester William Chambers, Kings Valley, Benton
Reid Conner Cochran, Corvallis, Benton
Chester DeBolt Lafferty, Corvallis, Benton
Shamus O'Brien McFadden, Corvallis, Benton
Walter Edmund Morris, Corvallis, Benton
Harrison Morton Roberts, Eugene, Lane
Reuben Leonard Stoneberg, Coburg, Lane
Arthur Vance Swartout, Pinckney Michigan

Pharmacy.

Ford Alger Hand, McMinnville, Polk
Edna Marie Harris, St. Helens, Columbia
Gertrude Estella Lilly, Corvallis, Benton
Joseph Gordon McKay, Portland, Multnomah
Elmer Milton McManus, Burns, Harney
Carl Henry Manock, Corvallis, Benton
Lawrence Aubrey Prescott. Manderson, South Dakota

Master of Science in Agriculture.

Ray Harland Roberts, Lebanon, Linn

Electrical Engineer.

Fred Egerton Ewart, Portland, Multnomah

Diploma School of Music.

Queen Inez Johnson, Corvallis, Benton
Lada Flo Patterson, Corvallis, Benton
Vena Rickard, Corvallis, Benton
Elma Ola Rogers Corvallis, Benton
Elnora Margaret Studtell, Halsey, Linn

REPORT OF THE TREASURER.

The report of the Treasurer for the year ending June 30, 1911, appears in the published report of the President of the Board of Regents for the year 1910-1911, pages 33 to 38 inclusive. It is not thought necessary, therefore, that the report for that year be republished here.

To the Honorable Board of Regents,
Agricultural College of the State of Oregon.

Gentlemen:

Herewith I submit my report for the fiscal year ending June 30th, 1912. The vouchers and other evidence of payment are on file in the office of the Financial Secretary.

Respectfully submitted,
B. F. IRVINE,
Treasurer.

July 15, 1912.

TREASURER'S REPORT.

General Maintenance Receipts.

State Appropriation	$150,000.00
Federal Appropriation (Morrill Fund)	50,000.00
Interest, Land Grant Fund (Act 1862)	10,493.11

College Miscellaneous.

Sales.

Domestic Science	$ 13.75	
Horticultural Department	5.50	
Zoology and Entomology	21.75	
Printing	5.45	
Floriculture	349.82	
Heating	38.85	
Mechanical Engineering	39.60	
Light and Power	240.00	
Commerce	12.00	
Water Tax	458.00	
Chemistry	21.00	$ 1,205.72

Fees and Deposits.

Agronomy	205.45		
Animal Husbandry	117.50		
Bacteriology	82.00		
Botany and Plant Pathology	489.51		
Dairy Husbandry	168.75		
Horticulture Department	414.00		
Zoology and Entomology	261.25		
Civil Engineering	129.00		
Electrical Engineering	134.80		
Mechanical Engineering	1,812.25		
Mining Engineering	162.50		
Highway Engineering	1.00		
Domestic Science	1,399.50		
Domestic Art	417.50		
Commerce	462.25		
Pharmacy	376.80		
Chemistry	3,229.26		
Physics	341.00		
Art	187.75		
Physical Education	2,184.75	$ 12,576.82	
Entrance	$6,635.15		
Graduation	426.50	7,061.65	$ 20,844.19
Amount forwarded			$231,337.30

Miscellaneous.

Rental, Cauthorn Hall	$ 820.00		
Rental, Waldo Hall	2,357.35		
Rental, Director's residence	150.00	$ 3,327.35	
Institute per diem (prior to July, 24, 1911)		385.00	
Stallion Registration Board Fees		333.75	
Sale of brick (net)		1,483.08	
Sale of Pharmacy (or Alpha Hall)		800.00	
Sale of Wilson residence		900.00	$ 7,229.18
Total Receipts			$238,556.48

GENERAL MAINTENANCE DISBURSEMENTS.

The report of June 30, 1911, contemplated reimbursing this fund to the amount of $11,696.51, expended therefrom for Equipment, Improvement and Repair, but it being found impracticable under the statutes to do so, this fund, instead of having a balance of $5,509.15, had an

apparent overdraft of $5,787.36, but this being found entitled to a credit from other former charges, was reduced to a net overdraft for the year of		$ 3,912.74
Salaries, Morrill Fund	$150,000.00	
State Interest	10,421.57	
Maintenance	79,564.70	139,986.27
Labor	4,935.74	
Supplies	13,401.14	
Heating	12,037.79	
Insurance	284.86	
Light and power	3,014.77	
Telephone and telegraph	560.34	
Postage and stationery	1,939.80	
Printing and advertising	8,486.50	
Water tax	2,144.35	
Traveling expenses	1,747.53	
Janitorial	7,369.33	
Campus	4,500.46	
Miscellaneous	1,381.04	61,803.75
College Miscellaneous—		
Improvements and repairs	$ 1,158.65	
Equipment	287.65	1,446.30
Total disbursements		$207,149.06

RECAPITULATION.

Total receipts	$238,566.48	
Total disbursements	207,149.06	
*Balance July 1, 1912		$ 31,417.42

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*This balance was offset by outstanding obligation amounting to approximately $26,000, leaving a net balance of about $5,000.

SPECIAL APPROPRIATION.

Receipts and Expenditures From January 1, 1911, to June 30 1912.

	Appropriation.	Expenditures.	Balance.
Equipment	$ 60,000.00	$ 56,292.68	$ 3,707.32
Improvement and repairs	40,000.00	34,527.35	5,472.65
Books, magazines and periodicals	15,000.00	7,494.12	7,505.88
Lands	25,000.00	23,257.50	1,742.50
Buildings—			
Horticulture	36,600.00	43,700.50	*7,100.50
Armory	6,000.00	407.94	5,592.06
Dairy	29,700.00	28,840.26	859.74
Farm mechanics	14,600.00	14,615.03	*15.03

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*Deficit

Foundry	11,000.00	9,898.80	1,101.20
Stock judging	7,600.00	5,580.84	2,019.16
Mining	28,000.00	13,520.67	14,479.33
Total	$273,500.00	$238,135.69	$35,364.31

STATE APPROPRIATIONS.

Receipts and Disbursements for Year Ending December 31, 1911.

SCIENTIFIC INVESTIGATION—

Appropriation .... $ 10,000.00

Disbursements.

Salaries	$ 2,243.30	
Labor	510.85	
Postage	3.85	
Freight and express	30.43	
Chemical Supplies	1.40	
Supplies	151.27	
Feed stuff	1,908.06	
Tools and Machinery	214.43	
Furniture and Fixtures	206.00	
Livestock	695.20	
Traveling expenses	89.51	
Contingent expenses	35.00	
Buildings	66.58	6,155.88

Balance December 31, 1911 .... $ 3,844.12

CROPS AND FRUIT PESTS—

Appropriation .... $ 15,000.00

Disbursements.

Salaries	$ 4,324.68	
Labor	756.51	
Publications	160.10	
Postage and stationery	25.95	
Freight and express	32.73	
Chemical supplies	.40	
Supplies	286.35	
Library	730.58	
Tools and machinery	39.30	
Furniture and fixtures	125.00	
Scientific apparatus	499.06	
Traveling expenses	827.15	7,807.81

Balance December 31, 1911 .... $ 7,192.19

STATE APPROPRIATIONS.

Receipts and Disbursements for Year Ending December 31, 1911.

AGRICULTURAL INSTITUTES—

Appropriation		$ 2,500.00
Disbursements.		
Salaries	$ 362.00	
Labor	54.95	
Publications	254.83	
Postage and stationery	189.33	
Freight and express	19.46	
Chemical supplies	16.68	
Supplies	213.53	
Furniture and fixtures	131.10	
Scientific apparatus	212.32	
Traveling expenses	1,031.80	
Contingent expenses	5.00	
Buildings	9.00	2,500.00

BUREAU OF MINES—

Appropriation		$ 1,000.00
Disbursements.		
Salaries	$ 45.00	
Publications	503.91	
Postage and stationery	.30	
Freight and express	.89	
Supplies	190.70	
Furniture and Fixtures	29.35	
Traveling expenses	229.85	1,000.00

STATION MISCELLANEOUS.

Receipts and Disbursements From July 1, 1911, to June 30, 1912.

Receipts.		
Balance July 1, 1911	$ 1,125.88	
Sales	7,252.22	$ 8,378.10
Disbursements.		
Agronomy	$ 225.18	
Animal Husbandry	2,630.50	
Dairy Husbandry	2,091.36	
Poultry Husbandry	1,237.58	
Horticulture	341.81	
Agricultural Chemistry	548.87	
General labor	176.91	7,252.22
Balance June 30, 1912		$ 1,125.88

STATE APPROPRIATION, BRANCH EXPERIMENT STATIONS.

From January 1, 1911, to December 31, 1911.

	Moro	Union	Hermiston	Harney	So. Ore.	Total
Receipts—						
Appropriation	$2,500.00	$7,500.00	$3,000.00	$4,000.00	$5,000.00	$22,964.70
Miscellaneous Receipts	$ 214.70a		750.00b			
Disbursements—	$2,714.70	$7,500.00	$3,750.00	$4,000.00	$5,000.00	$22,964.70
Overdraft, January 1, 1911	413.73		453.71			
Salaries	553.33	2,128.31	1,644.87	493.33	918.77	
Labor	735.69	2,213.95	216.03	120.00		
Publications	1.00					
Postage	40.73	69.05	10.30	44.18	9.70	
Freight and Express	116.30	142.65	5.80	4.80	57.13	
Heat, Light and Water	4.20	64.25	1.75			
Chemical Supplies		4.45				
Supplies	471.84	1,058.60	42.20	12.40	20.45	
Feeding Stuffs	72.00	139.57		324.60	437.00	
Library					106.03	
Tools and Machines	61.70	146.30	26.90		1,543.97	
Furniture and Fixtures	33.75	7.50	3.30		120.50	
Scientific Apparatus		.75			730.07	
Livestock		1,247.12			700.00	
Traveling Expenses	71.20	217.75	51.55	466.75	240.64	
Contingent Expenses	133.50				45.00	
Buildings	1.30	59.75	80.15	451.07		
Transferred to Hermiston Miscellaneous. (Transferred by operation of new statute from the General Fund to Miscellaneous Fund).			1,213.44			
Total Disbursements	$2,680.27	$7,500.00	$3,750.00	$1,917.13	$4,929.26	$20,776.66
Balance	$ 34.43			$2,082.87	$ 70.74	$ 2,188.04

a—Amount used as revolving fund, returned. b—Part of appropriation of 1910.

STATE APPROPRIATION BRANCH EXPERIMENT STATIONS.

From January 1, 1912, to December 31, 1912.

	Moro	Union	Hermiston	Harney	So. Ore.	Total.
RECEIPTS—						
State Appropriation	$2,500.00	$7,500.00	$3,000.00	$4,000.00	$5,000.00	$22,000.00
	$2,500.00	$7,500.00	$3,000.00	$4,000.00	$5,000.00	$22,000.00
DISBURSEMENTS—						
Salaries	$ 300.00	$2,280.00	$2,070.00	$1,025.00	$2,641.70	$
Labor	732.13	2,094.50	316.62	797.75	1,278.57	
Publications		1.25				
Postage and Stationery	29.95	69.54	9.45	18.50	19.98	
Freight and Express	79.67	37.87	34.05	584.18	50.82	
Heat, Light and Water	5.45	54.85		47.00		
Chemical Supplies					1.85	
Seeds and Sundry Supplies	144.34	170.88	79.01	6.78	171.88	
Fertilizers					53.13	
Feeding Stuffs	155.36				54.83	
Library		374.71		626.25	30.50	
Tools and Machinery	431.05	79.50	35.15	57.25	46.14	
Furniture and Fixtures	1.30		20.80		68.75	
Scientific Apparatus					156.55	
Livestock	555.00	55.00				
Traveling Expenses	25.90	133.70	11.95	121.30	203.11	
Contingent					16.40	
Building and Repair	39.85	732.85	247.06		127.20	
Total Disbursements	$2,500.00	6,084.65	$2,824.09	$3,284.01	$4,921.43	$19,614.18
Balance		$1,415.35*	$ 175.91*	$ 715.99	$ 78.57	$ 2,385.82

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*Outstanding claims will cover.

MISCELLANEOUS RECEIPTS—BRANCH EXPERIMENT STATIONS.

January 1, 1911, to December 31, 1911.

	Union.	Hermiston.
RECEIPTS—		
Balance, January 1, 1911	$3,453.23	
Sales	$4,556.07*	
Balance from General Fund	....	$1,213.44
	$8,009.30	$1,213.44
DISBURSEMENTS—		
Salaries	$1,422.14	
Labor	531.50	
Postage and Stationery	23.72	
Freight and Express	3.20	
Light and Water	8.75	
Seeds and Sundry Supplies	414.57	
Feeding Stuffs	57.45	
Tools	.75	
Traveling Expenses	26.35	
Total Disbursements	$2,488.43	
Balance, December 31, 1911	$5,520.87	$1,213.44

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*Of the above amount $1,648.00 was from sales of previous years.

MISCELLANEOUS RECEIPTS—BRANCH EXPERIMENT STATIONS.

From January 1, 1912, to December 31, 1912.

	Moro.	Union.	Hermiston.	Total.
RECEIPTS—				
Balance, January 1, 1912	....	$5,520.87	$1,213.44	$6,734.31
Receipts from sales	$ 587.61	$8,067.62	$1,286.84	$9,942.07
	$ 587.61	$8,067.62	$1,286.84	$9,942.07
DISBURSEMENTS—				
Salaries	....	....	$ 413.10	
Labor	$ 112.00	$ 195.00	$ 9.60	
Publications	4.00	....	....	
Postage and Stationery	12.60	1.25	4.65	
Freight and Express	7.69	....	16.38	
Heat, Light, Power and Water	7.96	....	....	
Chemical Supplies	1.00	....	....	
Seeds and Sundry Supplies	6.90	17.00	6.80	
Feeding Stuff	.50	....		
Tools and Machinery	8.80	....	.15	
Traveling Expenses	....	....	.60	
Contingent Expenses	11.00	....	....	
Building and Repairs	71.20	1,779.19	185.00	
Total Disbursements	$ 243.65	$1,992.44	$ 636.28	$2,872.37
Balance, December 31, 1912	$ 343.96	$6,075.18*	$ 650.56	$7,069.70

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*Unpaid balance of contract for erection of barn, amounting to $3,283.00, is chargeable against this balance.

EXPERIMENT STATIONS—UNITED STATES APPROPRIATIONS.

Receipts and Disbursements for Year Ending June 30, 1912.

Receipts.

	Hatch.	Adams.
Federal appropriation (Acts 1887, 1906)	$15,000.00	$15,000.00

Disbursements.

	Hatch.	Adams.
Salaries	$ 8,251.66	$10,711.29
Labor	1,933.31	460.38
Publications	119.28	....
Postage and stationery	162.09	9.00
Freight and express	136.84	97.78
Heat, light and water	187.39	79.18
Chemical supplies	241.93	773.90
Supplies	441.22	259.40
Fertilizers	13.00	....
Feeding stuffs	1,542.48	597.40
Library	....	16.21
Tools and machinery	167.66	48.70
Furniture and fixtures	56.65	39.90
Scientific apparatus	150.22	1,043.93
Livestock	1,474.06	2.00
Traveling expenses	36.05	481.40
Contingent expense	25.00	....
Buildings and lands	61.16	379.53
	$15,000.00	$15,000.00

LIST OF EMPLOYES AND THEIR SALARIES FOR THE YEAR ENDING JUNE 30, 1912.

This list shows the names and official positions of all persons regularly employed by the Oregon Agricultural College during the year ending June 30, 1912. The salary amount is the yearly rate, and not the amount actually received by those giving less than twelve months' service. The division of the salary between College and Experiment Station funds is also given. The list does not include farm and other miscellaneous laborers.

Name and Official Position—	Station	College	Total
WILLIAM JASPER KERR, D. Sc., President		$ 5000	$ 5000
JAMES WITHYCOMBE, M. Agr., Director of Agricultural Experiment Station, Professor of Animal Husbandry	$ 2150	550	2700
ARTHUR BURTON CORDLEY, M. S., Dean of School of Agriculture, Professor of Zoology and Entomology	1000	1500	2500
GRANT ADELBERT COVELL, M. E., Dean School of Engineering and Mechanic Arts Professor of Mechanical Engineering		2200	2200
JOHN ANDREW BEXELL, A. M., Dean of School of Commerce Professor of Business Administration		2200	2200
ANNA ZOU CRAYNE, A. B., M. D., Dean of Women Instructor in English		1800	1800
JULIET GREER, A. M., Dean of School of Domestic Science and Art, Professor of Domestic Science (Resigned July, 1911.)		2000	2000
HENRIETTA WILLARD CALVIN, S. B.,* Dean of School of Domestic Science and Art, Professor of Domestic Science		2500	2500
EDWIN DEVORE RESSLER, A. M., Professor of Industrial Pedagogy Director of the Summer School		2200	2200
RALPH DORN HETZEL, A. B., LL. B., Director of Extension, Professor of Public Speaking		2200	2200
FREDERICK BERCHTOLD, A. M., Professor of English Language and Literature		2000	2000
JOHN B. HORNER, A. M. Litt. D., Professor of History and Political Science		1600	1600

GORDON VERNON SKELTON, C. E., Professor of Civil Engineering		2100	2100
EDWARD RALPH LAKE, M. S., (on leave of absence) Professor of Botany and Forestry			
JOHN FULTON, M. S., Professor of General and Analytical Chemistry		2000	2000
THOMAS HENRY CRAWFORD, A. M., Professor of Commercial Law (On leave of absence.)			
CLAUDE ISAAC LEWIS, M. S. A., Professor of Horticulture	1550	850	2400
FRED LEROY KENT, B. Agr., Professor of Dairy Husbandry	700	1300	2000
CHARLES LESLIE JOHNSON, B. S., Professor of Mathematics		1800	1800
CLARENCE MELVILLE McKELLIPS, Ph. C., Professor of Pharmacy		1900	1900
LOUIS BACH, M. A., Professor of Modern Language		1700	1700
THOMAS MOONEY GARDNER, M. M. E., Professor of Electrical Engineering (Resigned September, 1911.)		1900	1900
JAMES DRYDEN, Professor of Poultry Husbandry	1700	500	2200
HENRY DESBOROUGH SCUDDER, B. S., Professor of Agronomy	1200	1000	2200
HENRY MARTIN PARKS, B. S., E. M., Professor of Mining Engineering		2100	2100
WILLIAM FREDERICK GASKINS, B. S., Professor of Music (Depends on fees)			
WILLIAM ARTHUR JENSEN, Recorder of the Faculties, Secretary to the President		1900	1900
GEORGE WILCOX PEAVY, M. S., Professor of Forestry		2000	2000
FARLEY DOTY McLOUTH, B. S., Professor of Art		1500	1500
WILLIBALD WENIGER, Ph. D., Professor of Physics		1800	1800
HERBERT SPENCER JACKSON, A. B., Professor of Botany and Plant Pathology	1000	1000	2000
CLARENCE A. DOBELL, Manager Business Office	750	1250	2000
IDA ANGELINE KIDDER, A. B., B. L. S., Librarian	200	1300	1500

ERMINE L. POTTER, B. S., Professor of Animal Husbandry	500	1300	1800
THEODORE DAY BECKWITH, M. S., Professor of Bacteriology	750	1150	1900
WILLIAM ARTHUR HILLEBRAND, A. B., Professor of Electrical Engineering		2000	2000
HELEN BRYCE BROOKS, Professor of Domestic Art		1800	1800
EDWARD JAMES STEWART, M. D., Director of Athletics, Professor of Physical Education for Men		2000	2000
WILLIAM C. MILLER, Lieut. 23rd Inf. U. S. A., Commandant of Cadets, Professor of Military Science and Tactics		600	600
MARION SYDDUM VAN LIEW, Professor of Domestic Science (Resigned September, 1911)		1800	1800
VICTOR RAY GARDER, M. S., Associate Professor of Horticulture	800	1200	2000
MARK CLYDE PHILLIPS, B. M. E., Associate Professor of Mechanical Engineering Superintendent of Heat		1800	1800
IDA BURNETT CALLAHAN, B. S., Asst. Prof. English Language and Literature		1400	1400
NICHOLAS TARTAR, B. S., Assistant Professor of Mathematics		1400	1400
ELMER POLIC JACKSON, B. S., Superintendent of Carpentry Shop, Asst. Professor of Technical Woodwork		1800	1800
GEORGE ROBERT HYSLOP, B. Sc., Assistant Professor of Agronomy	400	1400	1800
ERNEST FLAGG AYERS, Highway Engineer		2000	2000
MYRTLE CLARK VAN DEUSEN, Asst. Professor of Domestic Science (Resigned September, 1911.)		1500	1500
ARTHUR GEORGE BOUQUET, B. S., Asst. Professor of Vegetable Gardening	450	1050	1500
SAMUEL HERMAN GRAF, M. S., Asst. Professor of Experimental Engneering		1400	1400
JULES FERNANDO MOREL, M. D. C., Asst. Professor of Veterinary Science (Resigned September, 1911.)		1200	1200
HAROLD MANLEY TENNANT, Registrar		1200	1200
HECTOR MACPHERSON, Ph. D.,			

Assistant Professor of Political Economy		1600	1600
AVA B. MILAM, Ph. B., A. M., Assistant Professor of Domestic Science		1800	1800
HARRY L. BEARD, B. S., Instructor in Mathematics, Director Cadet Band		1100	1100
LOREN BURTON BALDWIN, A. M., Instructor in English		1400	1400
WILLIAM McCAULLY PORTER, Instructor in Forging		1000	1000
ARIEL MIRIAM EWING, Instructor in Domestic Art (Resigned September, 1911.)		1200	1200
HELEN HYDE TOBIN, Instructor in Domestic Art (Resigned September, 1911.)		1200	1200
CARL LAFAYETTE KNOPF, M. E., Instructor in Mechanical Engineering		1400	1400
WINIFRED MAUDE WILLIAMS, B. Ph., Instructor in Public Speaking and in Physical Culture for Women (Resigned August, 1912.)		1400	1400
EDWARD BENJAMIN BEATTY, B. S., Instructor in Mathematics		1400	1400
EARL PAUL HARDING, B. S., Instructor in Chemistry		1300	1300
GENEVIEVE BAUM-GASKINS, Instructor in Music (Depends on fees.)			
OTTO GERALD SIMPSON, B. S., Instructor in Dairy Husbandry	300	900	1200
RENTON KIRKWOOD BRODIE, B. S., Instructor in Chemistry		1400	1400
EDGAR RAYMOND SHEPARD, A. M., Instructor in Physics and Electrical Engineering		1300	1300
EMMETT B. MOORE, Instructor in Commerce		1400	1400
ROBERT HENRY ROGERS, B. S., Instructor in Patternmaking		1200	1200
GERTRUDE EWING McELFRESH, A. B., Instructor in English		1200	1200
MYRTLE ELIZABETH KNEPPER, B. S., Asst. Librarian (Resigned, December, 1911)		840	840
FLETCHER AMOS GOULD, B. S., Instructor in Civil Engineering		1300	1300

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*Appointed January, 1912. Assumed duties July 1, 1912.

MILO REASON DAUGHTERS, A. M., Instructor in Chemistry	1400	1400
WILBUR LOUIS POWERS, M. S., Instructor in Agronomy	1500	1500
EDWARD CLEVELAND CALLOWAY, B. S., Instructor in Pharmacy (Resigned July, 1911)	1200	1200
ALICE LEORA EDWARDS, S. B., Instructor in Zoology and Entomology	900	900
JAMES ARBUTHNOT, B. S., Instructor in Physical Education	1200	1200
MAY BABBITT-RESSLER, Instructor in Music (depends on fees)		
FLORENCE BOWDEN, Instructor in Latin and Music	500	500
GEORGE R. SAMSON, B. S., Instructor in Animal Husbandry	1400	1400
EDITH CARTER KUNEY, A. B., Instructor in Modern Language	900	900
WILLIAM E. LAWRENCE, B. S., Instructor in Botany	1300	1300
SAMUEL M. P. DOLAN, C. E., Instructor in Civil Engineering	1200	1200
CLIFTON LEROY FLINT, B. S., Instructor in Landscape Gardening	1300	1300
LAWRENCE F. WOOSTER, B. S., Instructor in Electrical Engineering	1400	1400
FREDERICK WILLIAM GREVE, JR., Instructor in Mechanical Engineering (Resigned October, 1911.)	1200	1200
GEORGE FRANCIS SYKES, M. A., Instructor in Zoology	1200	1200
GRACE CAMBELL, B. S., Instructor in Mathematics	900	900
PAUL JAY BATKIN, A. B., Instructor in Public Speaking (Resigned July, 1911.)	1200	1200
RAY HERBERT DOBELL, A. B., Instructor in Art	1200	1200
FRANCES HOUSTON, B. S., Instructor in Physical Culture for Women	600	600
ARTHUR MATHIAS SWARTLEY, B. S., M. E. Instructor in Mining Engineering	1400	1400
STANTON GRIFFIS, A. B., Instructor in Public Speaking (Resigned August, 1911.)	1200	1200

ALFRED GUNN LUNN, Instructor in Poultry Husbandry		700	700
JAMES KOEBER, B. S., Instructor in Farm Mechanics (Resigned September, 1911.)		1100	1100
FRED EDGERTON EWART, B. S., Instructor in Physics and Electrical Engineering		1100	1100
LUCY M. LEWIS, Cataloguer in Library		1200	1200
JOHN MONTGOMERY SPEIDEL, B. S., Instructor in Horticulture		1100	1100
FRED VERNON TOOLEY, B. S., Orchard Foreman, Instructor in Horticulture (Resigned February, 1912.)	300	600	900
ALBERT F. J. LAFKY, B. S., Orchard Foreman, Instructor in Horticulture	300	600	900
AMBROSE E. RIDENOUR, B. S., Instructor in Foundry Practice		1200	1200
ESTHER BERTHA SELEEN, B. S., Instructor in Domestic Art		1200	1200
ALONZO F. VASS, M. S., Instructor in Bacteriology	600	600	1200
SIDNEY WILLIS FRENCH, E. MET., Instructor in Mining Engineering		1400	1400
MAX ADAMS McCALL, B. S., Instructor in Farm Mechanics		1100	1100
EDGAR PERKINS WALLS, M. S., Instructor in Botany		1200	1200
CHARLES GEORGE WILTSHIRE, Instructor in Plumbing and Steam Fitting		1140	1140
HAROLD STEPHENSON NEWINS, Ph. B., M. F., Instructor in Forestry		1200	1200
SIGURD H. PETERSON, B. A., Instructor in Public Speaking		1200	1200
BENJAMIN WARD HOLLIS, D. V. M., Instructor in Veterinary Science		1000	1000
PAUL MEREDITH COLLINS, A. B., Secretary of Extension, Instructor in Public Speaking		1200	1200
CHARLES E. OWENS, A. B., A. M., Instructor in Botany		1200	1200
MRS. LIDA M. LAYTON, B. S., Instructor in Domestic Science		1200	1200

LOIS FAILYER, B. S., Instructor in Domestic Science		1300	1300
IDA ROBINSON-MOORE, Assistant in Commerce		600	600
FRED EUGENE PERNOT, B. S., Assistant in Electrical Engineering (On leave of absence.)			
FLOYD ROWLAND, B. S., Assistant in Chemistry		600	600
ESTHER VESTAL LEECH, B. S., Assstant Preceptress Women's Dormitory, Assistant in Domestic Science and Art		800	800
BERTHA HERSE, B. S., Assistant in Library		480	480
ERWIN BETRAN LEMON, B. S., Assistant in Commerce		400	400
RUTH McNARY SMITH, B. S., Assistant in Domestic Art		600	600
GORDON VERNON COPSON, B. S., Assistant in Bacteriology (Resigned April, 1912.)		400	400
MARGARET McCALL, Assistant in Domestic Science (Part time.)		240	240
ELTA RABER, B. S., Assistant in Domestic Art (Part time.)		420	420
EDWARD JACOB KRAUS, B. S., Reserach Assistant in Horticulture	1800		1800
BERT PILKINGTON, B. S., Research Assistant in Chemistry	1250		1250
RALPH WALDO REES, B. S., Research Assistant in Horticulture (Resigned April, 1912.)	1300		1300
FRANK ROSS BROWN, B. S., Orchard Foreman	1200		1200
LYMAN BUNDY, B. S., Research Assistant in Chemistry	1000		1000
HELEN HOLGATE, B. S., Clerk Experiment Station	1000		1000
CHARLES CHAUNCY LAMB, Foreman Poultry Plant	900		900
HAILEY FROST WILSON, B. S., Research Assistant in Entomology	1500		1500
VICTOR I. SAFRO, B. S. A., Research Assistant in Entomology	1500		1500

R. H. ROBINSON, A. B., Research Assistant in Chemistry	900		900
E. ROSS STOCKWELL, B. S., Research Assistant in Dairy Husbandry	900.		900
H. L. REES, A. B., Research Assistant in Plant Pathology	1100		1100
F. C. BAILEY, A. B., Research Assistant in Plant Pathology	1100		1100
HOWARD P. BARSS, A. B., S. M., Research Assistant in Plant Pathology	1800		1800
HENRY ELLSWORTH EWING, Ph. D., Research Assistant in Entomology	1200		1200
A. LESTER LOVETT, B. S., Research Assistant in Entomology	1400		1400
ROBERT WITHYCOMBE, B. S., Superintendent of Eastern Oregon Branch Experiment Station at Union	1800		1800
RALPH W. ALLEN, M. S., Superintendent of Branch Experiment Station at Hermiston	1500		1500
H. J. C. UMBERGER, Superintendent Branch Dry-Land Experiment Station, Sherman County (Resigned October, 1911.)	1800		1800
ORREN BEATTY, B. S., Assistant Branch Experiment Station Sherman County	900		900
DAVID E. STEPHENS, B. S., Superintendent Branch Dry-Land Experiment Station, Sherman County	1800		1800
LEROY BREITHAUPT, B. S., Superintendent Harney Valley Branch Experiment Station	1200		1200
B. F. IRVINE, Treasurer Board of Regents		600	600
E. E. WILSON Secretary Board of Regents		400	400
ALICE LINDSEY WEBB, Editor Press Bulletins		1200	1200
ANNIE PETTINGELL, Housekeeper at Waldo Hall (Paid from Dormitory receipts)	.	720	720
GEORGE B. KEADY, Foreman Printing Plant	500	700	1200
DAVID MASTERTON, Campus Foreman		1080	1080

JAMES A. GILKEY, Greenhouse Foreman		900	900
JOHN H. EDWARDS, Head Janitor		1100	1100
ELLSWORTH ERWIN, Janitor		720	720
FRED C. PEIL, Clerk Business Office (Resigned Jan., 1912)		900	900
MARY BOWMAN, Stenographer Offices President and Registrar		900	900
MABEL CADY, B. S., Stenographer Business Office		720	720
PEARL LEONARD, B. S., Stenographer in Botany and Plant Pathology	540	180	720
MAY WORKINGER, Stenographer for Dean School of Agriculture and Department of Entomology	360	360	720
O. B. HARRIMAN, Auditor and Bookkeeper Business Office		1500	1500
W. O. BERGHOLZ, Clerk in Business Office		780	780
WILHELMINA GILL, Clerk in Business Office		900	900
LAURA PERSINGER, Stenographer in Business Office		480	480
MABEL TURLAY, Stenographer in Agronomy Department		660	660
E. F. BUTTS, Stenographer in Agronomy Department (Part time.)		300	300
CLARA RADDAS, Stenographer in Horticultural Department	500	220	720
VIOLA GARDNER, B. S., Stenographer in Mining Department and Bureau of Mines		540	540
RAE MOORE, Stenographer in Extension Department		600	600
BEULAH GILKY, B. S., Clerk in Registrar's Office		480	480
VEDA NEWTON, Clerk in Bookstore (Paid from Bookstore receipts)		360	360
C. E. ROBINSON, Foreman Stock Farm	720		720
M. D. HALL, Gymnasium Janitor		600	600

J. G. TAYLOR, Fireman Old Heating Plant		650	650
JOHN HEESZEL, Fireman New Heating Plant		650	650
HENRY OETJAN, Fireman New Heating Plant		600	600

CHANGES IN FACULTY.

1—RESIGNATIONS—

The following is a list of resignations since June 30, 1911, with the date of resignation and the annual salary rate at the time of resignation:

Date of Resignation.	Name and Official Position.	Annual Salary Rate.
June-July, 1911—		
	JULIET GREER, A. M., Dean of Domestic Science and Art, Professor of Domestic Science	$2,000
	U. G. McALEXANDER, Major 13th Inf., U. S. A., Commandant of Cadets, Professor of Military Science and Tactics	1,000
	ELMER GEORGE PETERSON, Ph. D., Professor of Bacteology	1,800
	EDWARD CLEVELAND CALLAWAY, M. S., Instructor in Pharmacy	1,200
	PAUL J. BATKIN, A. B., Instructor in Public Speaking	1,200
August, 1911—		
	MARION SYDDUM VAN LIEW, Professor of Domestic Science	1,800
	MYRTLE CLARK VAN DEUSEN, Assistant Professor of Domestic Science	1,500
	ARIEL MIRIAM EWING, Instructor in Domestic Art	1,200
	HELEN HYDE TOBIN, Instructor in Domestic Art	1,200
	BURTON LEIGH CUNNINGHAM, B. S., Instructor in Mining Engineering	1,500
September, 1911—		
	JULES FERNANDO MOREL, M. D. S., Assistant Professor of Veterinary Science	1,200
	THOMAS MOONEY GARDNER, M. M. E., Professor of Electrical Engineering	1,900
	JAMES KOEBER, B. S., Instructor in Far mMechanics	1,100
	H. J. C. UMBERGER,, Superintendent Sherman County Dry-Farm Branch Station at Moro	1,800

October, 1911—	
FREDERICK WILLIAM GREVE, JR., B. S., M. E., Instructor in Mechanical Engineering	1,200
STANTON GRIFFIS, A. B., Instructor in Public Speaking	1,200
November, 1911—	
MALCOLM R. COX, B. S., Acting Commandant of Cadets	1,200
MYRTLE ELIZABETH KNEPPER, B. S., Assistant in Library	840
February, 1912—	
LEONARD CARPENTER, A. B., Instructor in Public Speaking	1,200
FRED VERNON TOOLEY, B. S., Orchard Foreman; Instructor in Horticulture	900
April, 1912—	
T. F. DARCY, Assistant in Military Department	550
RALPH WALDO REES, B. S., Research Assistant in Horticulture	1,300
June, 1912—	
CLIFTON LEROY FLINT, B. S., Instructor in Floriculture and Landscape Gardening	1,300
FLETCHER AMOS GOULD, B. S., Instructor in Civil Engineering	1,400
FRED EDGERTON EWART, B. S., Instructor in Physics and Electrical Engineering	1,100
FRANCES HOUSTON, B. S., Instructor in Physical Education for Women	900
LIDA MEREDITH LAYTON, Ph. B., Instructor in Domestic Science	1,200
LOIS FAILYER, B. S., Instructor in Domestic Science and Art	1,300
RAY HERBERT DOBELL, A. B., Instructor in Art and Architecture	1,200
July, 1912—	
ERNEST FLAGG AYERS, Assistant Professor of Civil Engineering; Highway Engineer	2,000
MAX ADAM McCALL, B. S., Instructor in Farm Mechanics	1,100
August, 1912—	
ANNIE PETTINGELL, Housekeeper at Waldo Hall	720
SIDNEY WILLIS FRENCH, E. M., Instructor in Mining Engineering	1,400
WINIFRED MAUDE WILLIAMS, B. Ph., Instructor in Physical Education for Women	1,400
November, 1912—	
O. B. HARRIMAN, Auditor and Bookkeeper in Business Office	1,500

December, 1912—	WILLIAM C. MILLER, Lieut. 23rd Inf., U. S. A.; Commandant of Cadets; Professor of Military Science and Tactics	600
	ALBERT F. ESCHRICHT, B. S., in charge Bookstore	720

2—PEOPLE EMPLOYED—

Following is a list of the people employed since June 30, 1911, the month when duties of position were assumed and the annual salary rate for first year:

Date when duties of position assumed.	Name and Official Position.	Salary Rate.
July, 1911—	BURTON LEIGH CUNNINGHAM, B. S., Instructor in Mining Engineering	$1,500
	FLOYD DOUGLAS BAILEY, A. B., Research Assistant in Plant Pathology	1,100
	FREDERICK CHARLES BRADFORD, M. S., Research Assistant in Horticulture	1,200
August, 1911—	REGINALD H. ROBINSON, A. B., Research Assistant in Chemistry	900
	HARRY L. REES, A. B., Research Assistant in Plant Pathology	1,100
	LEROY BREITHAUPT, B. S., Superintendent Harney Valley Branch Experiment Station	1,200
	A. LESTER LOVETT, B. S., Research Assistant in Entomology	1,400
September, 1911—	THEODORE DAY BECKWITH, M. S., Professor of Bacteriology	1,900
	WILLIAM ARTHUR HILLEBRAND, A. B., Professor of Electrical Engineering	2,000
	MRS. HELEN BRYCE BROOKS, Professor of Domestic Art	1,800
	HECTOR MACPHERSON, Ph. D., Assistant Professor of Political Economy	1,600
	JOHN MONTGOMERY SPEIDEL, B. S., Instructor in Horticulture	1,100
	AMBROSE ELLIOTT RIDENOUR, B. S., Instructor in Foundry Practice	1,200
	ESTHER B. SELEEN, B. S., Instructor in Domestic Art	1,200
	SIDNEY WILLIS FRENCH, E. Met., Instructor in Mining Engineering	1,400
	MAX ADAMS McCALL, B. S., Instructor in Agronomy	1,100
	HAROLD STEPHENSON NEWINS, Ph. B., M. F., Instructor in Forestry	1,200

LEONARD CARPENTER, A. B., Instructor in Public Speaking	1,200
HARRY BELKNAP, B. S., Assistant in Physics (part time)	346
JOSEPH B. YODER, B. S., Instructor in Mechanical Drawing (part time)	300
MALCOM R. COX, B. S., Acting Commandant of Cadets	1,200
HENRY ELLSWORTH EWING, Ph. D., Research Assistant in Entomology	1,200
October, 1911—	
WILLIAM C. MILLER Lieut. 23rd Inf., U. S. A., Commandant of Cadets	600
AVA B. MILAM, Ph. B., A. M., Assistant Profesor of Domestic Science	1,800
EDGAR PERKINS WALLS, M. S., Instructor in Botany	1,200
SIGURD H. PETERSON, B. A. Instructor in Public Speaking	1,200
MRS. LIDA M. LAYTON, Ph. B., Instructor in Domestic Science	1,200
E. ROSS STOCKWELL, B. S., Research Assistant in Dairy Husbandry	900
November, 1911—	
CHARLES GEORGE WILTSHIRE, Instructor in Foundry Practice	1,140
December, 1911	
ALONZO F. VASS, M. S., Instructor in Bacteriology	1,200
BENJAMIN WARD HOLLIS, D. V. M., Instructor in Veterinary Science	1,000
LOIS FAILYER, B. S., Instructor in Domestic Science	1,300
T. F. DARCY, Assistant in Military Department	550
January, 1912—	
EDWARD JAMES STEWART, M. D., Professor of Physical Education	2,000
RACHAEL WEBB HAIGHT, Assistant in Library	840
GLANCY RALSTON, Research Assistant in Horticulture, (part time)	500
February, 1912—	
PAUL MEREDITH COLLINS, A. B., Secretary of College Extension, Instructor in Public Speaking	1,200
CHARLES E. OWENS, Instructor in Botany	1,200
HOWARD P. BARSS, A. B., S. M., Research Assistant in Plant Pathology	1,800
March, 1912—	
ALBERT FRED JOHN LAFKY, B. S., Orchard Foreman	900
MARGARET McCALL, B. S., Assistant in Domestic Science	240
April, 1912—	
ELTA RABER, B. S., Assistant in Domestic Art	350

July, 1912—

MRS. HENRIETTA WILLARD CALVIN, S. B., Dean of School of Domestic Science and Art, Professor of Domestic Science	2,500
JOHN E. COOTER, Assistant in Agronomy(part time)	435

August, 1912—

ARTHUR LEE PECK, B. S., Associate Professor of Landscape Gardening and Floriculture	2,100
ALBERT F. ESCHRICHT, B. S., Manager College Bookstore	720
MIRIAM THAYER, A. B., Professor of Physical Education for Women	1,800
DARWIN G. THAYER, B. S., Instructor in Woodwork	900
EDWIN T. REED, B. S., A. B., College Editor	1,800
SARAH L. ELWIS, Instructor in Domestic Science	1,000
CHARLES REYNOLDS, Assistant in Military Department	425
ANNIE L. ROBINSON, B. S., Instructor in Domestic Art	1,500
HILDA MILLER, S. B., Instructor in Chemistry	1,200
MERRIS M. McCOOL, Ph. D., Assistant Professor of Soils	1,800

September, 1912—

WILLIAM ALFRED BEVAN, B. S., Instructor in Physics	1,200
D. BRUCE BLAIR, A. M., Instructor in Physics	1,000
MRS. ALICE M. DOLMAN, M. S., Instructor in Domestic Science	1,000
REX E. EDGECOMB, B. S. in C. E., Instructor in Civil Engineering	1,400
ALICE H. EGBERT, A. B., Instructor in English (part time)	500
FORD A. HAND, B. S., Instructor in Pharmacy (part time(	500
BARBARA MOORE, B. S., Assistant in Domestic Science	600
CAROLYN M. PLOCK, Instructor in Physical Education for Women	1,100
FAY HARRY ROSENCRANTZ, B. S., Instructor in Mechanical Engineering	1,400
LAURA PRATT, H. M., Assistant in Art	600
ODITH K. SPURRIER, Assistant in Experimental Engineering Laboratory (part time)	346

October, 1912—

HARVEY GODFREY McCOMB, Instructor in Patternmaking	1,400
E. M. D. BRACKER, Instructor in Farm Mechanics......	1,500
GEORGE EDWARD GOODSPEED, S. B. Instructor in Mining Engineering	1,200

3—LEAVES OF ABSENCE—

Since June 30, 1911, leaves of absence, without pay, have been granted to the following:

ROBERT HENRY RODGERS, B. S., Instructor in Patternmaking. August 1912, granted leave to study at Teachers' College, Columbia University, New York.

RUTH McNARY SMITH, B. S., Instructor in Domestic Science. July, 1912, granted leave to study at Teachers' College, Columbia University, New York.

HELEN M. GILKEY, M. S., Instructor in Botany. July 1912, leave of absence extended one year in order that she might continue with advanced work at the University of California.

Elsewhere in this report is given a list of changes in faculty for the period June 30, 1911, to December 31, 1912. It is not thought necessary, therefore, that a list of the present employes be given at this time. Such a list will appear in the report for the year ending June 30, 1913, when published.

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